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Light and LIGHTING

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The Cheapness of Light

WHATEVER the differences of opinion between members of the public as to the wisdom or folly of "statesmen" in general, and of the particular sample whose recent actions have aroused so much discussion, it is evident that the public is already bearing, and must continue to bear, the burden of higher costs as one of the first and most certain fruits of the Suez affair. But, if the New Year begins thus inauspiciously, there is all the more reason for counting our blessings—be they large or small. One of them is certainly the cheapness of man-made light. It is now possible to light our homes resplendently at low cost, and parsimony in the matter of domestic lighting is not only financially unrewarding but is Stygian as well as stingy. The recent reduction in the price of electric lamps adds force to our argument. "Light is eminently a source of pleasure, which rises in degree, within certain limits, in proportion to the abundance of the luminous emanation . . . our experience of a brilliantly lighted room exemplifies strikingly the pleasurable and exciting influence of a copious illumination." So wrote an eminent nineteenth-century student of human nature (Alex. Bain), and he was but one of many, before and since, who have stated this eternal truth.

Notes and News

LIGHTING in the home is featured in this issue and will be recurring during the present year. Lighting as a factor of safety in the home was mentioned in a recent paper to the Royal Society of Arts by the Director-General of the Royal Society for the Prevention of Accidents.

The number of fatalities as a result of accidents in the home is overshadowed by the prominence given to road accidents. In Great Britain on an average 45 people die every day as the result of accidents of one kind or another:—

14 on the roads	} i.e., 16 in some form of travel
1 on the railways	
1 in air and water transport	
2 in factories	} i.e., 5 in places of work
1 in coal mines	
2 in farms, quarries, etc.	
17 inside the home	} i.e., 24 in and around the home
7 in everyday pursuits	

The home is obviously a much more dangerous place than we realise and, as General Young points out, very little is being done about, or spent upon, home accident prevention. Seventy per cent. of fatal accidents in the home happen to people aged 65 or over and the majority of these are as the result of falls. In 1954 7,723 people died from accidents in the home; 5,412 were aged 65 or over and 890 were under five years of age.

Two causes of accidents are poor sight and inadequate lighting. The proportion of accidents due to these is not known but we would guess that as many, if not more, accidents are caused in the home from bad lighting as are caused on the roads from bad street lighting. This is not to belittle the cause of better street lighting but rather to urge a far greater effort to educate the public, builders and local authorities on the vital importance of good lighting in the home.

The Lighting Society

The proposal to change the name of the IES to "The Lighting Society" is exciting considerable interest, as might be expected. We hear that the preliminary expression of members' opinions on this matter, which the IES Council wisely invited, showed that a majority is in favour of the proposed

change. However, when the question is actually put to the vote at an extraordinary general meeting of the Society, a still larger majority will be required if the change is to be effected. Apparently the feeling in favour of a change to a more suitable title is more widespread than the feeling in favour of the particular title proposed. Possibly this is because it is not difficult to think of several other titles which may be thought worthy of consideration and members were not told why the various alternatives were actually discarded in favour of "The Lighting Society."

Long and careful consideration was, in fact, given by the IES Council to this obviously important matter of choosing the most suitable name. We understand that, eventually, discussion centred around a short list of nine titles. They were: (1) The British Lighting Society, (2) The Lighting Society, (3) The Society of Light, (4) The Lighting Society of Great Britain, (5) The Society of Lighting and Illuminating Engineering, (6) The Institution of Illuminating Engineering, (7) The Institute of Lighting, (8) The Society of Lighting, (9) The Institution of Lighting Engineers. In considering the respective merits of these titles the first thing to note is that in some the word "Society" is used while others use "Institute" or "Institution." The last two words are generally applied to professional bodies and are not really applicable to a body such as the IES because it is by no means exclusively a professional organisation. For this reason it is unlikely that the Board of Trade—whose approval of a title is necessary—would agree to the use of either of those words, especially if objections to their use were received from existing professional institutions. Cultural bodies, of which the IES is one, are generally known as Societies and, whatever its new name may be, the Society should remain a "Society." On this account titles numbers 6, 7 and 9 are unsuitable. If "Society" were substituted for "Institution" in title number 6 all that would be achieved is a change in the order of the words of the existing title. If the word "Society" is substituted for "Institute" in title number 7 this title then becomes identical with number 8. Number 9 is unsuitable either as it stands or if the word "Society" were used because a great many members are not, and do not profess to be, professional lighting engineers.

Six of the remaining proposed titles remain to be

considered. Of these numbers 1 and 4 contain, respectively, the words "British" and "Great Britain." These were thought unsuitable for inclusion in the title because the IES has a Centre outside Great Britain—the Transvaal Centre; but, if these words are dropped titles 1 and 4 are identical with number 2. As for title number 3, it seems evident that the Society's "field" is better indicated by the word "lighting" than by "light." Probably most people will agree that title number 5 is cumbersome and that there is little to commend it. Thus, out of nine titles proposed only two eligibles are left; they are "The Lighting Society" and "The Society of Lighting." These differ only in the order of the words and, by a large majority in Council, the former was selected.

In writing to members of the Society on this subject, Mr. A. G. Higgins, during this year off office as President, explained very clearly why a change of title is desirable. "The emphasis is no longer on the 'engineering' of 'illumination' and the practice of lighting now involves the study and consideration of many other arts and sciences, as, for example, vision and architecture, the work of the lighting designer now covering a much wider field than that of providing a certain illumination at a certain place . . . the Council has had to consider the present and future activities of the Society, which it feels are much more aptly expressed by 'lighting' than by 'illuminating engineering.' Another advantage of the recommended title is that it would be more readily understood by the layman who frequently does not understand without explanation the meaning of the present title. Further, such a title might well induce many who are interested in lighting, but who are deterred by the inclusion of 'engineering' in the present title, to take some interest in the Society and its activities."

In a matter of this kind sentiment has to be reckoned with, and we know there are some members of the Society who are reluctant to abandon the name which has been in use for nearly 50 years. However, we know of an even older Society whose members recently put expediency before sentiment so that their Society might bring its title up to date. The IES is approaching its golden jubilee and some members think the title should not be changed before this event. There is, of course, another point of view which should not be overlooked. Much publicity will be given to the Society during the jubilee year so that it will become known to a much wider public. Would not the value of this publicity be lost if the Society's name were changed after it? On the other hand, the golden jubilee offers a golden opportunity to bring the Society to the notice of the public under the name which maturity has brought it. We believe there is

also some feeling that "engineering" in the present title of the IES attracts as many people as will be attracted for different reasons if this word is dropped. This is an opinion at variance with that expressed in the letter quoted above but, so far as we can judge, it is very much a minority opinion. What has surprised us most is an objection that "lighting" does not imply vision, whereas "illuminating engineering" implies both lighting and vision. Surely "lighting" includes the concept of vision, and is meaningless without it.

Architecture for Lighting Engineers

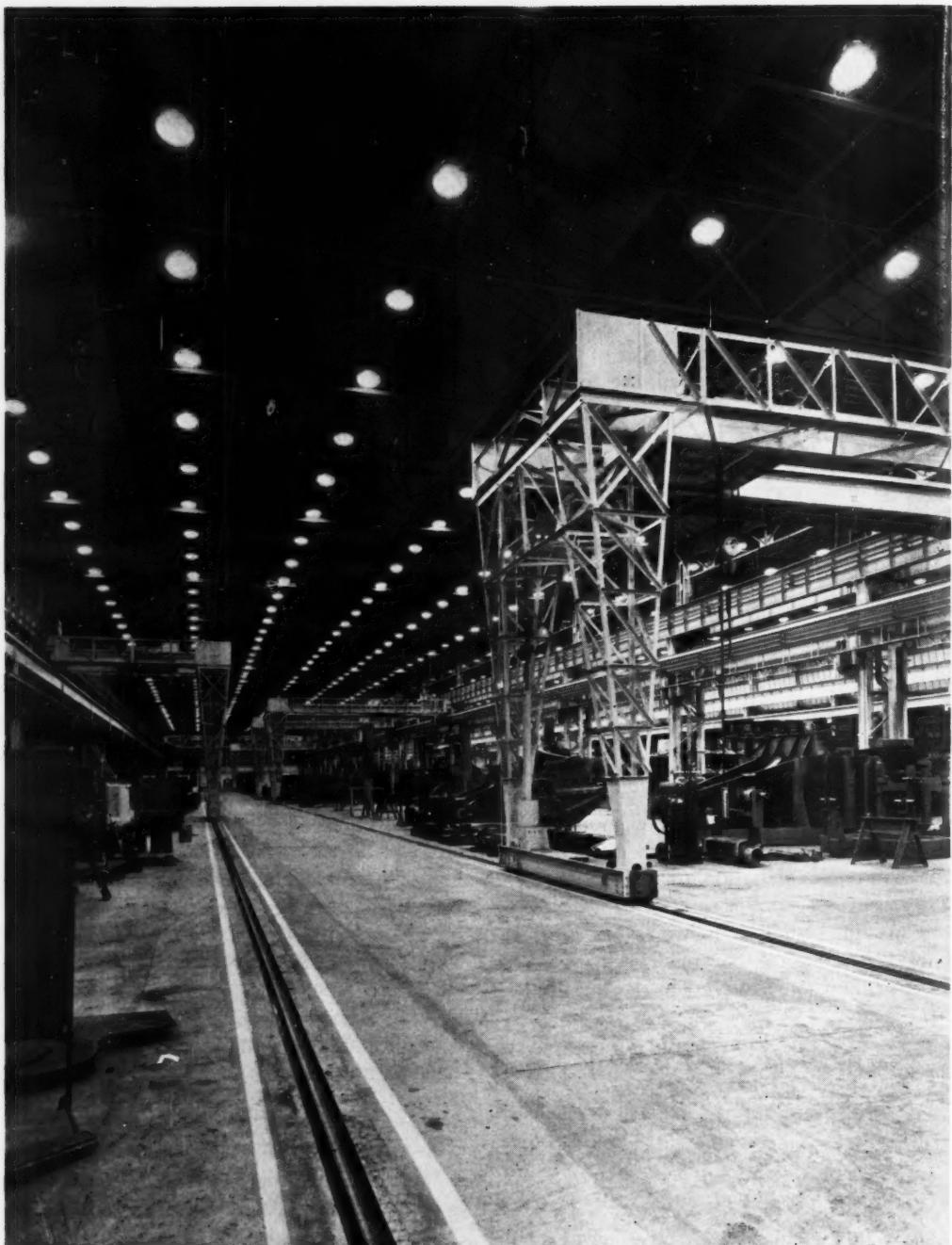
The four talks by John Reid took place as announced and four very successful and enjoyable evenings they were. When the talks were first suggested it was thought that an audience of 20 to 30 would make the effort worth while—though John Reid, being an enthusiast, was prepared to talk to a much smaller audience. It turned out that the average audience was between 70 and 80. There can be little doubt from this that lighting engineers, particularly the younger ones of whom the audiences mainly consisted, plus a few young women, are very willing to learn something of the architect's job and outlook. (What a pity it is that the architects are not prepared to take as much trouble to learn something about lighting.)

No doubt many who turned up for the first talk did so wondering what it would all be about. They attended the subsequent talks not only because they found the subject interesting but also because of the way it was put over. One can't expect to learn much about the subject in four lectures, but at least those who attended will be able to look at architecture much more intelligently and the majority will probably try to learn a good deal more.

Full marks to John Reid, and to Sylvia who ably assisted throughout, on a first class job.

Belgian Lighting Society

We hear that the first steps have been taken to form a lighting society in Belgium. A meeting to discuss the idea was attended by nearly 200 people representing local authorities, manufacturers, police, etc. It would seem that the original idea was for a society concerned with public lighting only, but one of the suggested titles (Association Belge des Eclairagistes) would indicate the possibility of a wider field of interest. At the time of going to press we only know that a decision has been taken to form a society and that someone, who has our sympathy, has been given the job of drawing up a constitution. We hope to know more shortly.



An installation of 400-watt fluorescent mercury lamps at the Euclid (Great Britain) Ltd. works at Newhouse, Lanarkshire, where heavy earth moving machinery is made. 600 lamps are used in two large bays each 570 ft. x 80 ft.; lamps are mounted at 33 ft.; the illumination at floor level is 50 lm/ft².

Random Review of 1956

By A. G. PENNY

BEFORE the conference of the Association of Public Lighting Engineers at Blackpool in September, I spent the week-end walking the hills in the Lake District. At one point my way was barred by a vast bog, wet, black and of incredibly "gooey" consistency; a real British Standard bog. Only at one spot could I see a place where a young and agile man could jump safely across. I looked at it, decided I was no longer young and agile, but seeing no alternative I jumped, hoping that Fear and Necessity would add sufficient impetus to my ageing limbs; we only just failed. After I had extricated myself I plodded on wetter and wiser, and pondered upon the importance of small increments; two inches less in distance or an extra poundal of thrust and all would have been well. This pondering led me on to think how readily small increments can be mistakenly ignored in other spheres. Perhaps we should not sneer at the film magnate who attaches so much importance to another half-inch on his star's vital statistics; indeed it is indisputable that the public flock to fill the cinema wherein are portrayed the charms associated with 39½ inches but are quite unattracted by a rival presentation associated with 39 inches, regardless of the fact that even in the flesh the difference is only detectable with the aid of a tape measure! In other words, one more lumen per watt *does* count.

As I get older and begin to have a better appreciation of what I don't know, it is a never-ending source of amazement to realise how much I can learn by looking backwards. For instance, there was an intriguing paragraph by that argumentative but anonymous fellow "Lumeritas" in the October issue about fallacies in the design of the industrial environment as revealed in the annual report of the Medical Research Council. He referred to the fallacy that steady conditions are best for working and the fact that the most talkative man in the lighting industry—Matt Luckiesh—had stressed the need for change in lighting conditions nearly 40 years ago in his classic *The Lighting Art* (not *Lighting Act*, please Mr. Editor). I can do no better than quote the following extract and invite you to reflect on the degree of progress since 1917:

"Variety is one of the vital necessities for human endurance and even for existence. How strange it is that this innate demand for variety has not extended more definitely to lighting for, with comparatively simple expedients, no other source is so productive of variety. A few extra outlets for portable lamps, simple combinations of lighting principles in portable lamps and in suspended fixtures, two- and three-circuit fixtures each providing light of different distribution and possibly of different tint are possibilities for obtaining a distribution and colour of light to suit the mood or the occasion. However, the provisions for obtaining variety in lighting seldom extend beyond a two-circuit unit providing only a possibility of varying the intensity of light, and a few connections for portable lamps, although simple combinations of accessories and of multiple circuits are sources of this most appealing feature of lighting."

Luckiesh goes on to remind his readers that landscapes look their best in the early morning or late evening and dullest on an overcast day, and suggests that deliberate asymmetry in lighting schemes is a desirable feature. This gave me to think that, as we are now conditioned to asymmetric colour schemes in our homes, we might at long last begin to think along similar lines in our lighting.

Conferences

The theme of variability was, of course, one of the main points made by Strange and Hewitt in the opening paper of the IES Summer Meeting at Harrogate. In their well-demonstrated paper attention was drawn to the effects produced by deliberate changes of brightness and of colour. That such changes can be stimulating and, indeed, extremely interesting is without question, as is exemplified by any theatrical performance. Nevertheless, what is good for the stage or shop window is not usually satisfactory in the intimacy of the home. On the stage it is necessary to be larger than life, as anyone can see by watching a televised performance from a theatre, but lighting effects in the home must be tuned to the tempo of ordinary people. It would in consequence be interesting to hear the experiences of someone who has *lived* with colour and brightness changes. Maybe continued living in very exotic conditions quickly tends to dull one's reactions just as the highly-spiced and exaggerated language affected by actors off-stage seems to the actors to be only normal. They regard ordinary conversation as unutterably dull and mousy; so perhaps would we grow to regard ordinary lighting if we could install automatic colour change systems in our lounges and kitchens. Or would we always be brought back to normality by daylight?

Between the opening and concluding papers at Harrogate, both of which dealt with aesthetics, it was effective to have to descend to the practicalities of McCulloch's paper on the lighting of small factories and that of Hawkins and Veness on the design of lighting equipment. Both papers may be regarded as a salutary reminder that a balanced diet calls for plain bread and butter as well as cake.

The papers by Havelka and Schneider both merited more time than was allotted to them, and I am reminded that on a previous occasion when the late Andre Claude addressed the Society there was also not enough time for discussion. The Summer Meetings have achieved a reputation—not restricted to this country—of providing plenty of time for proper discussions, and it is a particular pity if discussions are curtailed when the lectures are given by overseas visitors. It is inevitable that there can be less planning in regard to such contributions than in the case of papers presented by British speakers, and there might therefore always be some risk of the discussion petering out. Judging from past experience, however, the reverse is the more likely, so please more time for discussion.

Reference to the IES meeting would not be complete without a comment on the paper by Ferguson and Stevens. It was, I think, one of the few serious attempts to find out why so many motorists appear to find lighting by sodium lamps so attractive. Too many efforts on this and on the parallel case of yellow headlamps have been more concerned to justify the researchers' own predilections or to prove that the layman does or does not know what he is talking about. Such work is probably much more difficult than work on purely objective matters, but lighting is a matter of both the objective and subjective, and we must give more attention to the subjective.

The colorimetricians are perspiring gently, for the very rock on which they have built their system of colour measurement is shaking; the sanctity of the V_λ curve is being questioned, and soon the CIE may have to decide that certain modifications are necessary. The V_λ curve is the spectral sensitivity curve for the "average" human eye under human photopic conditions, and photopic conditions, by the way, are high brightness conditions such as we experience in the daytime. An apparently unwarranted connection between the V_λ curve and the y curve has been



400-watt fluorescent mercury lamps at Birkenhead Graving Docks. (AEI photo.)



Wall mounting in the City of London. (Siemens photo.)

exposed by a number of colorimetric discrepancies that can no longer be ignored. I never could understand why the two curves should have the same shape. Seriously, the proposed changes are quite small and will be of little practical importance to the ordinary lighting engineer. The need for these changes emphasises, however, the dangers of being too dogmatic, even about scientific matters.

The annual conference of the German IES (Lichttechnische Gesellschaft) was noteworthy for yet another reminder of the neglect of good street lighting as a safety factor; Professor Brandt reminded his audience that in Western Germany the seriously injured in road accidents fill 70 hospitals. Professor Schneider presented an interesting paper on pleasantness and comfort in lighting in which he advanced the theory that humans prefer a "cooler" light for working than for relaxation and that there is also a yearly cycle of human preference in regard to colour. Yet another corroboration of Luckeish's theory of change. Another subject, not receiving much attention in this country, was that of the artificial fading of dyes and textiles; an installation of xenon lamps giving 20,000 lux was described in which temperature and humidity were controlled so that conditions corresponded very closely with those of natural daylight.

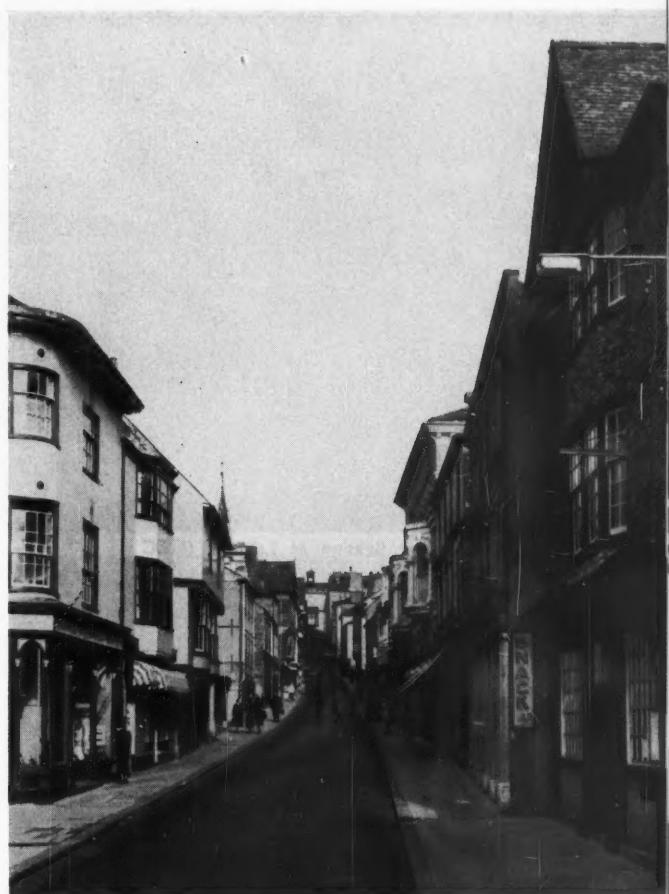
The AFE meeting in Tours was very ably reported in the July issue of this journal and not having been present, I feel it would be presumptuous of me to try to add any personal comments. Nevertheless, I think it is not inopportune to comment on the statements by M. Chayal that whilst 25 per cent. of France's electricity is used for lighting lamps, in Paris the figure is no less than 40 per cent. So the reputation of "Gay Paree" is well founded!

The recent conference of the APLE (now 32 years old) was the first one since the death of someone who I suppose may well rank as one of the most outstanding in scientific street lighting. Without his courage in staging large-scale experiments in the streets of Sheffield this country might well be still as backward as other countries. J. F. Colquhoun was shrewd enough to see that the public needed to see how its money was spent; once assured that it was being spent well and wisely it could be persuaded to pay up with grace. Thus it was that the grand demonstration-experiment Colquhoun staged on the occasion of the CIE meeting in England in 1931 first showed the British public what good street lighting was. I believe that it is from this act that modern British street lighting has stemmed.

As to the Blackpool conference itself I confess to a mixture of satisfaction and disappointment. Satisfaction at the bold and challenging remarks of the irrepressible Harry Carpenter and dissatisfaction at the lack of controversy.

British street lighting is so good compared with that in other countries that we are in danger of becoming complacent, as was stressed by some speakers at Blackpool. Indeed, despite the evidence of intensive activity by makers of British street lighting equipment there was, in fact, little which could be heralded as outstandingly new or even as heralding something new. Looking and listening at Blackpool, did anyone glean the idea that in the next decade the lighting of our streets would be notably different from that during the past decade?

It was a bold and attractive idea to formulate the same pattern for each paper, present practice and future trends; but inevitably it introduced a certain sameness into the proceedings and was not, I feel, wholly successful. For one thing the discussions tended to an even greater similarity. That on the paper by Holmes and Souter could almost equally have followed the paper by C. C. Smith. Consequently, there were not enough of those flat contradictions which make people think. And again, the extraordinary display of gentlemanly behaviour by the lecturers seems to me to be quite out of place—and out of tradition—at an



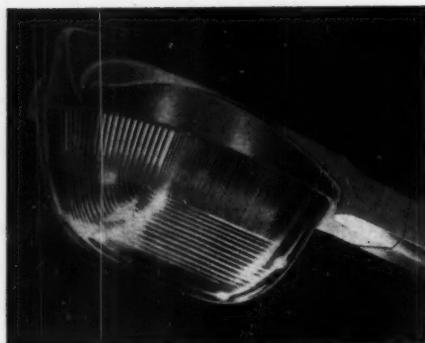
Unobtrusive wall mounting with conventional type lanterns at Totnes. (AEI photo.)



Post top lanterns at Ely. (GEC photo.)



Fluorescent street lighting at Luton. (GEC photo.)



Bowl refractor specially designed for use with 250- and 400-watt fluorescent mercury lamps. (Holophane photo.)



The old (left) and the new duplo beams. (Marchal Distributors photo.)

APLE conference. It's neither amusing nor educative to listen to speakers saying nice things about each other. And even Dr. Halbertsma was infected by this craze for kindly approval of one's competitors. Is the day coming when George Canning's famous message* (in cipher) to the British Ambassador at The Hague will be regarded as in rather bad taste? If this sort of thing catches on we shall have the Electric Lamp Manufacturers' Association voting funds for research on gas mantles!

The temptation to regard conferences as a form of holiday will be the end of conferences unless it is checked. Too many people seem unwilling to discuss unpalatable facts at the seaside, and it must be recognised that at a place like Blackpool it is very difficult not to feel on holiday; it is so pre-eminently a holiday town and nothing but. I cannot recall seeing any form of activity which suggested that the townsfolk had any interest other than catering for the seething millions who descend upon its famous promenade!

Despite the gentlemanly behaviour a few bricks were dropped with some effect. One brick, not so much dropped as well and truly laid, was the statement by Harry Carpenter that even though there was a public acceptance of street lighting the amount of public money spent on it to-day was less, in real value, than that spent in 1932. And just to shatter our British complacency, when A. G. Penny suggested that a small sum, say 1 per cent. of the total expenditure on street lighting, be set aside for experimentation in the street, Dr. Halbertsma commented that the Dutch Government had already spent 5-10 per cent. on such experimentation.

A conference that must have been very interesting was that held in Cleveland, U.S.A., in 1955, when 300 arborists, street lighting engineers and utility authorities met to study their common problem of how to co-exist on a narrow strip of public property and best perform their respective duties in the public interest. Although these authorities had had to co-exist since the beginning of street lighting and had had their own conferences for many years this was the first time that a jointly sponsored conference had been arranged. It is an idea which appeals to me and one which I suggest might well be followed in this country. True the IES holds joint meetings from time to time with kindred bodies such as the RIBA but on such occasions the meeting is too fleeting for the two interests really to get together.

* In matters of commerce the fault of the Dutch
Is offering too little and asking too much.
The French are with equal advantage content,
So we clap on Dutch bottoms just 20 per cent.

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Why not make the next Summer Meeting (or the 1959 Jubilee) an occasion for a series of joint conferences. I suggest starting with "Lighting as an aid to Road Safety" in collaboration with the Royal Society for the Prevention of Accidents and the APLE, not forgetting the road users as represented by the British Roads Federation and the Pedestrians Association. Another day could be devoted to "Lighting as an Aid to Productivity" in collaboration with the Productivity Council and the Institute of Management, with the users represented by the TUC and the Purchasing Officers Association. Yet another day could be for a Conference on "Light and Colour in the Home" with collaboration from the British Colour Council and the EAW, with the Association of Painters and Decorators to control the wilder flights of fancy, and so on. I do not envy the organisers of such a performance but it ought to be great fun.

IES Activities

Dr. Harper's presidential essay on the effect of lighting on the social history of Britain covered such a wide span of years that it was necessarily a broad survey possessing, as such, much to interest all members and likely to be thought-provoking to many. It is, however, a subject which, I feel, should not be left without more detailed study. For instance, when the technical skill of the Early English cathedral builders permitted them to build wider arches than their Norman forerunners, did they choose to fill the arches with glass to let more light in or were they attracted by the fact that with coloured glass, pictures of greater brightness could be achieved than with painting on walls? And again was it the Window Tax in 1696 that caused Adam to design houses with fewer but larger windows? Another interesting thought, for which I am indebted to my wife, is that the great increase in the literacy rate in the latter part of the nineteenth century must have come about in part as the result of night schools for workers and other after-work educational activities. Such opportunities could only have come about with the arrival of sufficient and cheap artificial lighting. It is interesting to recall that the Workers' Educational Association (WEA) is just about as old as the IES, as are also those centres of social life in the mining communities of South Wales, the 167 miners' halls, now financed by the NCB but originally private ventures created by the strong and militant social consciences of miners. It would be an interesting piece of research to see if any correlation could be established



Natural lighting, George Pindar School, Eastfield. (By courtesy of the architects, Gollins, Melvin and Ward.)



'Ventura' fittings in a secondary modern school at Southborough. (By courtesy of the architects, Gollins, Melvin and Ward, and Merchant Adventurers.)



Removable box-type 'Lentilite' fitting. Extreme right, installation at the Congregational Church, Markworth Estate, Derby (Holophane photos)



between the growth of evening education and that of artificial lighting. Perhaps the Illuminating Engineering Society could offer a scholarship for a thesis on this subject. It would, I think, be more useful than paying £75 for three essays on "How I Look at Lighting Engineering." Without meaning any disrespect for the competitors in the last Dow Prize competition, it seems to me that in its way the competition was just as big a flop as the previous one. Not putting too fine a point on it, my opinion is that an uninspiring subject produced uninspiring results.

The paper by Waigh and Wiltshire on the starting of fluorescent lamps was well received. To the ordinary man in the industry the situation is now very complex, what with "switch" start, "instant" start, "pulse" start, "rapid" start, "quick" start, "cold" start, "sequence" start—to mention only a few of the variants. There are, of course, many more words still to be used ("gentle," "gradual," "slick," "snappy" come readily to mind), and we have not yet made use of adjectival superlatives ("extra-instant," "super-rapid," "hyper-quick") nor has the matter got into the hands of the electronics boys, who would doubtless coin new and completely incomprehensible words. The paper was a useful attempt to summarise the data on some of the more popular methods of starting fluorescent tubes. So far as I can judge there is a steady swing towards starting by means of some form of cathode heating transformer and a growing recognition that, in the case of the 80-watt lamp at least, it is wise to use a lamp with an earthed metal stripe to ensure reliable starting under all conditions.

A recent journey from London Airport prompts me to mention the paper last February by Holmes on the lighting of the airport. It was quite a *tour de force* to describe in 40 minutes one of the largest and most varied installations in the country. There can be few other members who are capable of commenting with such authority on the multitude of uses to which lighting is put at this great traffic centre, and Mr. Holmes is to be congratulated on the skill with which he managed to combine description and criticism. It's a great pity that so few of his slides could be printed in the Transactions. But better Transactions, I understand, are coming.

It is perhaps a commentary on modern taste to reflect that the Leon Gaster Premium went to a paper by an artist, D. W. Durrant. Ten years ago a factual paper such as Holmes' would have been a more certain winner. If you doubt me look at the winners for the past 10 years.

Now that the IES Council has had the courage to consider abandoning the Society's antiquated old name, I suppose I can safely talk about a place being "lighted" by a "fitting" to an intensity of 25 "foot-candles" instead of being "illuminated" by a "luminaire" to 25 "lumens per square foot." Or not? Even with the assistance of Dr. Walsh I find our jargon complicated (although I must admit I do not often misunderstand what Dr. Walsh himself is trying to say); perhaps one of the joys of the English language is that it is only the etymological expert who is baffled when one uses the wrong word.

Lamps

When I think of the way in which light sources keep on developing I am reminded of the Tour de France cycle race with a new winning post every day. No sooner does one type jump ahead of its rivals than up bobs another

challenger. For instance, E. H. Nelson had some exceptionally interesting remarks to make when he opened the discussion after Cumming's paper at the APLE conference. It seems that incandescent filament lamps may again move up into first place with efficiencies as high as 40 lm/w. Nelson is of a somewhat retiring nature but he has had plenty of experience with electric lamps and those who know him admire the sincerity with which he works, so, though he said some startling things, we would do well to bear his prophecies in mind.

For a general outline of the lamp situation I cannot do better than refer the reader to Cumming's APLE paper itself (Light Sources—New Developments and Trends) but I would like to offer a few comments on one or two of the new developments.

"Pink Charms," "Soft Pearl Lights" or whatever you like to call them (ghastly confusion) are mentioned elsewhere and frankly I have nothing against them except slight disappointment at the sacrifice of efficiency. Regarded on its own, the reintroduction of filament lamps tinted a pastel pink might well be regarded as a catch-penny sales stunt. And yet, is not such a development part of an appreciation of the importance of colour in our daily life? Maybe the sales director who first sponsored it regarded it as a "gimmick" but the "back-room" boy who first produced it was probably sufficiently conscious of the trend towards colour in the home to realise that something more glamorous than the ordinary pearl lamps might well have a market. Anyhow, "gimmick" or not, the proposition has caught on and news now comes from America of yet further shades—"Sun-Gold," "Spring Green" and "Dawn Blue." Such developments should at least make it easy for dissatisfied lamp salesmen to seek further advancement in the hosiery trade—and vice versa! In the meantime Cromptons continue with their "Colour Glaze" range of ordinary colours as well as "Charmlight."

The tendency towards smaller and smaller filament lamps goes on as makers discover how to make better and better lamps. It is now spreading to the higher wattages and it seems only a matter of time before all ratings, right up to 1,500-watt, take a step down in size. When they do, let us hope that the step will be significant and not just a prelude to a series of minor modifications each one of which will be just a nuisance to the user and a source of expense to fittings designers. It is not often realised that as much as two years can elapse between the start of the design of a fitting and its appearance on the market. So please some stability after the change.

It is interesting to note how changes such as these stimulate advances by other sections of the industry. For instance, smaller bulbs mean hotter holders and fittings. So it is of interest to hear of action to raise the standard of bakelite lampholders by more rigid specifications, and the announcement by some cable makers, Callenders for instance, of high temperature wires for use in hot fittings. These two developments are particularly welcome as fittings generally have been somewhat weak in this direction.

I noted the introduction of the Bonus Line or axial filament GLS lamp (high wattage only) in America and made a quick calculation which revealed that an increase of nearly 30 per cent. in efficiency was possible by changing from a 240-volt 1,000-watt draped wreath filament lamp to a 110-volt 1,000-watt axial filament lamp. The possible increases of say 11 per cent. through using the lower voltage and say 16 per cent. through adopting the axial filament are not perhaps individually worthy of a major upheaval but together they make possible a significant increase in efficiency or life, according to which is economically preferable. So far as I can see, without delving into the matter

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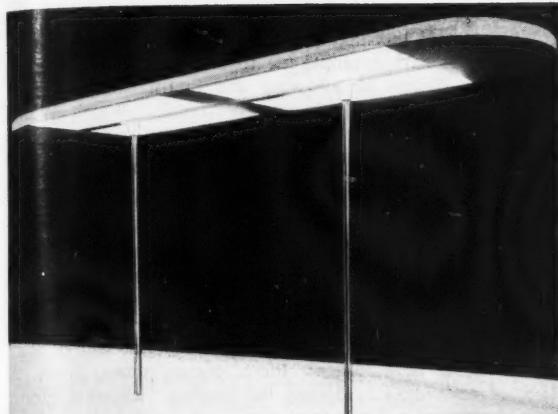
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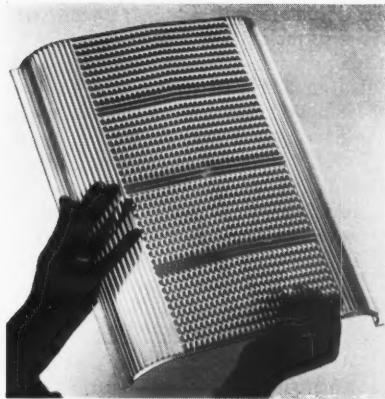
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'Teelon' illuminating canopy.
(Benjamin photo.)

'Holoflux'
refractor panel
for use with
fluorescent fittings.
(Holophane
photo.)



'Invertrunking,' supporting air ducts and Frenger ceiling
as well as the lighting fittings, at Humber Ltd., Coventry.
(A.E.I. photo.)



Pottery fittings at the L.D.B. Store, Portsmouth.
(Courtney, Pope (Elec.) photo.)

too deeply, the increase makes even the installation of a step-down transformer beside each lamp worth while.

The integral type sodium lamp looks as though it has come to stay. Much effort went into developing this lamp and apart from the increase in efficiency there are other less obvious but more valuable advantages such as reliable starting, fewer surfaces to get dirty and fewer items to stock and replace. It certainly looks like the sodium lamp of the immediate future, especially as hints of an even better performance keep on being dropped. One almost begins to hope for the lamp maker's equivalent to the four-minute mile—100 lm./w.

In the field of fluorescent tubes, the reflector type tube comes immediately to mind. It is unfortunate that it is not more readily available in more ratings and colours, and I think that for this reason its potentialities have scarcely begun to be exploited. I know and appreciate many of the difficulties that beset the lamp manufacturer and sympathise with him in his struggle to limit the range of types and variations but this does not prevent me from having my regrets. In industry and commerce (as in other fields) when one policy cuts across another it is not easy to see the right way to go.

Ultra-violet (black light) fluorescent tubes, which it originally seemed might be most used for advertising, are now being used increasingly in process engraving.

Work is going on in connection with xenon lamps but whilst these lamps are extremely interesting technically it does not look as though they are likely to find many applications outside the laboratory for some time to come.

Work also continues in many parts of the world on



Alan Brough at
the potter's
wheel. (GEC
photo.)

electroluminescent panels. I wish the workers luck but it looks to me as though, commercially at any rate, they have a long way to go. However, no one knows what the future holds in store and even if the electroluminescent panel is never a great success as a practical light source its study will undoubtedly help us in other ways.

With all the varied forms of starterless circuits now available the temptation to design down to a price becomes greater and greater. What is urgently required is a British Standard specification for such gear. And since it is all sold as "Instant," "Quick" or "Rapid" start could we please have some agreement as to starting time. I suggest, not more than two seconds at mains voltage minus 10 per cent., 100 per cent. humidity and no earth.

With the long foretold reduction in the price of fluorescent mercury lamps now a reality, it is reasonable to take a closer look at the uses to which they have already been put, both at home and abroad. With a full range from 80 to 1,000 watts there is a large variety of applications for which the lamps can be used. So far the smaller types seem to have found most application abroad in low intensity street lighting schemes where there is a deep rooted objection to the colour of sodium lamps. The value of colour correction provided by fluorescent mercury at such low levels seems hardly worth while to British eyes. Perhaps it is because there are so many more cars per mile of road in Britain and in consequence we tend to pay more attention to the needs of the motorist than to those of the pedestrian. Anyhow the fact remains that most British low wattage fluorescent mercury lamps go abroad as very welcome exports. Some of those that remain go into shop window installations where (as mentioned last year) they provide an exceptionally good colour when mixed with filament lamps and a high intensity with relatively low heat content.

The higher wattages, 250 and 400, are growing in use industrially where people are now conditioned to a good colour and where the large light output from a single unit reduces installation and maintenance cost; used in "through-draught" fittings maintenance may be reduced almost to the single job of lamp changing.

For street, yard and dock lighting, experience in other countries as well as here suggests a wider usage for these lamps, partly at the expense of plain mercury and, more particularly in the street, partly at the expense of fluorescent tubes. Where goods are handled at night there is much merit and less risk of error if the goods can be seen in their accustomed colours. Similarly in city centres and shopping streets the success of fluorescent tube lighting has stemmed from the good colour, triumphing over high cost and unattractive appearance. However, it is not unreasonable to expect the protagonists of tube lighting to fight a stern rear-guard action. After all, the reward to the seller of a fluorescent tube lantern is greater than to the seller of a fluorescent mercury lantern.

Further developments to be followed with great interest are modifications to these lamps designed to give either better colour or more light. An example of the former was shown with an intriguing absence of detail by H. G. Jenkins during his lecture to the Physical Society last May, whilst Sylvania have demonstrated the converse in the U.S. by using a phosphor which converts ultra-violet radiation into yellow-orange light; they get some 20 per cent. more light than from plain mercury and a better colour. The better colour is, of course, by comparison with plain mercury and is noticeably inferior to that of fluorescent mercury as we know it. So we can see emerging the same pattern in these lamps as already established in the fluorescent tube field; one range with a high efficiency and a moderate

degree of colour rendition and a "deluxe" range with good colour at some sacrifice in efficiency.

Which remark prompts me to record with approval the action of Philips in adopting the international trend in naming the colours of fluorescent tubes, "Warm White" or "Cool White," "Standard" or "Deluxe," and in passing to deplore the continuance of the name "Colour Matching" for one of the best and most useful colours in the British range. Given a better name it would have found its way into many a shop and store where a real daylight colour is required. But with a name like "Colour Matching" it will for ever linger in the stockroom; which is a pity because, apart from its usefulness, it is a British speciality and could enhance our export trade.

Just as everyone has been foreseeing the end of fluorescent tube development there comes news from the U.S. of new ideas to double the loading. General Electric have developed a "power-groove" tube with kidney-shaped cross-section, which permits a loading of some 100 watts in a 4-ft. length, or 200 watts in 8 ft. Little or no loss in efficiency is claimed, and with tube voltages similar to normal tubes the control gear is no more costly than for a corresponding wattage of ordinary tube. Sylvania, on the other hand, have filled a normal type of tube with neon-mercury instead of argon-mercury to achieve the high loading in a more conventional way. Such a design is probably less costly to make, although a very heavy cathode construction is required if a reasonable life is to be obtained (somewhat akin to that in neon floodlighting tubes for instance); control gear is likely to be much more costly as the tube volts are higher than normal. Nevertheless higher output fluorescent tubes are most desirable if we are to achieve the higher lighting intensities now demanded. It will be most interesting to see which way these new developments go and if they succeed in ousting our old friend the 5-ft. 80-watt tube from its position as the best all rounder. For the record it should be said that European makers are also interested; indeed, Jenkins showed a double-power tube at the aforementioned Physical Society lecture.

I mentioned last year the interesting project at the RAE of simulating, by means of 1-kw. tubular quartz lamps, the extreme conditions of heat which arise in the wings of supersonic aircraft. Now comes illustration of the versatility of these new lamps. Heat-sensitive duplicating paper has been developed by the Minnesota Mining and Manufacturing Co., and there is now available a small portable machine for duplication of documents, the use of which requires no skill and entails no complicated chemical development. The original and a piece of the duplicating paper are simply fed into the machine, irradiated for a few seconds by one of the lamps, and out comes a finished duplicate.

Atlas have designed an interesting circuit for fluorescent tubes. It is an AC/DC circuit which without any moving parts can change over from AC operation, with choke control, to operation from an emergency DC supply. This means that emergency batteries can be made to last longer or alternatively can be made to provide higher illumination values as may be very desirable, at least for a short time, when clearing a factory of personnel. Not every fitting in a factory would have to be of the AC/DC type, of course.

Street Lighting

There have been two pronounced trends in street lighting this year. The first is to do with finance and the second with aesthetics. The Ministry of Transport has been insisting

more firmly than ever on acceptance of the lowest price tender and the outcome of it all has been intense competition amongst manufacturers, with many firms being forced to redesign their equipment on cheaper lines. One large firm has developed no less than 27 new lantern designs in the past year.

The tactics of the MOT may be regarded as astute or retrograde, but on the whole I think the situation has been made more healthy than ever before. Cheapness undoubtedly results in poorer quality in some cases, but it also puts the efficient use of materials and manufacturing techniques at a premium. The need to redesign equipment has forced an opportunity in some cases to make improvements, notably perhaps as regards optical design. The street lighting world is very much alive just now.

In somewhat surprising contrast to the insistence on economy already mentioned is the apparent increase in aesthetic appreciation, as illustrated by the increasing demand for post-top lanterns, usually fitted with fluorescent tubes, which are at least semi-decorative and must therefore command a fairly high price. The increasing popularity of post-top lanterns is aesthetically a swing back to the age of gas lighting, but let no one despise it on that account for fashions have a habit of going full circle, and somehow the post-top lantern seems to harmonise rather well with the older surroundings, as at Ely, or in the cities of London and Edinburgh. The harmony may have something to do with the fact that this was the shape of things as we knew it in our youth, or perhaps it is just a question of integrated artistic design; I don't know.

Comments on street lighting inevitably centre on the APLE Conference, for which all the public lighting engineers save up their ideas. It is the one occasion in the street lighting year when information and opinion come out into the open. In short, if you want to know about street lighting, go to the APLE Conference.

To learn from C. C. Smith's paper at Blackpool that gas lighting provides some 40 per cent. and tungsten lighting some 50 per cent. of street lighting in this country served to emphasise the amount of development that still remains to be done. It would, I think, be a fair comment to say that, as far as light sources were concerned, the main emphasis at the Conference was on mercury, sodium and fluorescent lamps.

I was interested in Professor Halbertsma's comments on the Continental dislike of the uncorrected bluish colour of the plain type of mercury lamp. With one or two notable exceptions, where blended mercury and tungsten street lighting fittings have been in use for years, there seems to have been general acceptance of the colour of mercury lamps in this country. This being the case, the advent of the fluorescent mercury lamp and its improved colour has forced us to make a positive sales effort to attempt to persuade the user that there is something better than plain mercury lamps for street lighting; on the Continent no such effort is apparently necessary.

In a town like Blackpool it was easy for the delegates to forget the considerable amount of street lighting proper to be seen as soon as one left the promenade but those who did penetrate the interior were, I suspect, interested to note that those in authority have not used sodium—"regarding its colour as inconsistent with the holiday spirit."

The famous seven-mile promenade at Blackpool is a distinguished example of post top mounting, the lanterns each housing four, six or eight 2-ft 40-watt fluorescent tubes. Unfortunately delegates to the APLE Conference were deprived of an opportunity of seeing it, as it was completely disguised by the mass of illuminations which beset the promenade at the time of the conference.

The artistic design of columns and other street lighting



Eton RDC council chamber. (Falk, Stadelmann photo.)



The Highgate Courts of Justice. (By courtesy of the Architects' Dept., Middlesex C.C. and Merchant Adventurers.)

furniture has received much attention and plenty of evidence of this was to be found in the papers and exhibits at the APLE Conference. The Royal Fine Arts Commission have a say in aesthetics and I have the impression that in an appropriately quiet way their influence is becoming more widely felt, although it is still more censorial than creative. An item of small but significant importance was the objection



'Kitchenlight' fitting. (Thorn Elec. Ind. photo.)

by the Fine Arts Commission to the size of fluorescent luminaires which Westminster City Council selected for the re-lighting of some of London's main streets, Pall Mall, Piccadilly, etc. I understand they went further than merely objecting and suggested that fluorescent mercury lamps could be contained in luminaires more in keeping with the surroundings. Although the Commission received a somewhat dusty answer their action is I believe not without significance. We all remember when attempts by the Commission to advise on the appearance of luminaires was regarded as unwarranted interference, but now makers are proud of their commendation. Perhaps it may not be long before they are invited to approve the whole scheme—or even to collaborate in the planning thereof. If we could remember that the tourist industry is one of Britain's major dollar earners it might not seem a very far-fetched idea to retain John Betjeman and Ian Nairn as street lighting consultants.

Following on the work reported by Stevens and Ferguson at the APLE Conference in 1955, on the lighting of tree-lined roads, the GEC has now produced a lantern which provides a four-beam distribution as described in the paper. Further field trials have been carried out with the four-beam distribution and it has become evident that such a distribution is well suited not only to tree-lined roads but to side roads generally, where the needs of the householders and pedestrian merit more consideration than on main roads.

In caring for the needs of the pedestrian when lighting side roads there are two vital needs of the motorist that must not be overlooked; the motorist must not be misled as to the course of the road by bad siting of lanterns, as on bends, and he must not be prevented from identifying a road junction by a lantern being situated on his side of the junction, as is so often the case to-day. Lanterns in side roads need to be sited with as much care as those on main roads.

This is an opportunity for me to reiterate my plea for

more field experiments; let us not be afraid to invest a reasonable amount of money in field trials. Such investment would, I am sure, save unnecessary expenditure in the laboratory and save us from the stagnation which is liable to follow the publication of codes and specifications, however necessary, useful and generally admirable these documents may be.

The British Electrical Development Association must be mentioned for its continued study and propaganda for greater safety on the roads. The booklet "More Matters of Light or Death," which I was glad to see available at the APLE Conference, struck me as being a very good job well presented. Congratulations BEDA.

There is little doubt in my mind that fluorescent tubes are very suitable for lighting complicated road junctions. A particularly successful fluorescent installation has recently been put in at Luton, and I have included a photograph of a road junction to illustrate my remark.

Wall mounting lanterns are increasing in popularity and the technique would seem to have a considerable future. The Revo "Critchley" lantern introduced a few years ago showed the possibilities of specially designed lanterns, and there is now a fair range of wall mounting lanterns available from the various manufacturers.

I note, and generally approve, the tendency to follow Continental practice and tilt lanterns upwards, as Siemens have done in the case of their "Kuwait" lantern. Apart from making an installation a little more pleasant to look at, it enables a somewhat non-axial distribution to be obtained from a long light source. I would, however, like to sound one note of warning; the current types of sodium lamp do not like being tilted too much, especially where there may be appreciable vibration.

Several firms are now developing lanterns specifically for the new fluorescent mercury lamps and I am glad to see that Holophane, for so many years masters of prismatic glassware, now have a refractor for the 250- and 400-watt sizes. The Holophane bowl has been designed with three points in mind, to lead to more comfortable lighting: a large flashed area to reduce glare, a medium-angle beam also to reduce glare and, of course, the better colour-rendering properties of the lamp itself.

What about the 1,000-watt fluorescent mercury lamp, now available, for street lighting? If necessary, mount it at more than 25 ft. A worthwhile thought, I hope.

Whether the lighting of tunnels can properly be called street lighting I'm not sure. Nevertheless, there is a growing number of road tunnels, and as the number grows so does the number of lighting failures. It is a salutary reminder of the ignorance of lighting engineers to recall the remarks of Waldram at the Monte Carlo meeting of the Association Française des Eclairagistes in 1954—"Vehicular tunnels present a problem in lighting which has never been solved." On the face of it one would expect that the lighting problems would be relatively simple, since one has complete control of the environment—or should have if the lighting engineer is called in before the tunnel is built—but even then there are unexpected problems, as, for instance, the bright flashes produced on the windscreen when passing the lighting fittings. As Waldram remarked, however, the big problem is how to provide adequate visibility just inside the tunnel for a driver entering at speed with his eyes adapted to full sunlight. There is a classic example at London Airport. Driven under the main runway is a twin tunnel running almost due north and south and the would-be air traveller on a sunny winter's day faces the direct rays of the sun shining above the tunnel-mouth which, despite augmented lighting inside the entrance, appears just a black hole. Even if the tunnel walls were clean—which

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they are not—the intensity of lighting to produce an adequate luminance would have to be extremely high. Of the many ingenious methods of attaining an adequate brightness at the entrance the one that appeals to me is that used by M. Gaymard at the Porte de Vilette underpass in Paris. Here vertical louvres at right-angles to the traffic flow are coated with a retro-reflecting surface. (If you don't know what a retro-reflecting surface is, go into a photographic dealer's shop and ask for one. Having thereby confused the assistant and asserted your one-upmanship ask for a beaded screen).

In all the discussions about street lighting and vehicle lighting, the main subject is usually "how to see the unwary pedestrian" but little or no attention is given to the subject "how to see the unwary motorist." Surely the vast majority of pedestrians do not venture on the road if they can see a car coming. But they often get killed, so the assumption must be that they do not see the oncoming car. Consequently, should we not give more attention to finding out how to light our streets so that the cars can be seen from the pavement ("sidewalk" to American readers)?

I frequently think that there is a lot to be said for the American law that moving cars must have their headlight passing beam on; at least they can be distinguished from stationary ones. As an alternative, now that the tendency is to permit parking without side-lights in lighted streets, might not it be wise to make it compulsory to turn off side-lights on all parked cars? In a reasonably well lighted street side-lights are only a distraction; in a sodium lit thoroughfare they can be distractingly glaring. So let's make it compulsory to turn them off, then any white light seen by a pedestrian can be regarded as an indication of oncoming danger. And how much simpler to teach road safety: "Red lights are going away—cross in safety; white lights are coming towards you—don't cross."

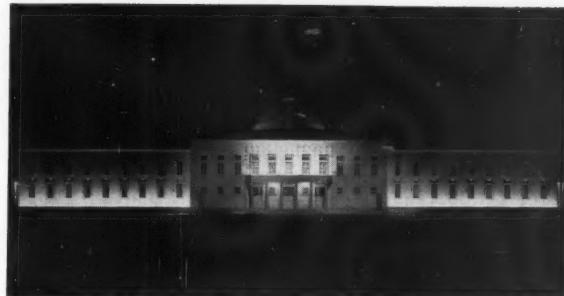
I note with great interest that the Continental development of asymmetric duplo headlighting is now virtually complete and that this new form of lighting will, in future, be fitted to all Continental vehicles as standard practice. The old symmetrical form of dipped beam has a reputation for being dazzling but the sharp cut-off employed provides only a very limited range of vision. The new asymmetric beam maintains the existing freedom from dazzling but considerably increases the range of vision along the near-side curb.

The new beam is achieved by redesign of both headlamp lens and bulb construction, the important feature being the design and accurate positioning of the secondary filament shield. The beam is in effect split in two, the off-side half retaining the sharp cut-off giving substantial freedom from dazzling whilst the near-side half of the beam is elevated through 15 deg., resulting in considerably better visibility along the near-side of the road. The new bulb is of the prefocused rear entry design and can be rotated as required to adjust the beam pattern for right or left hand drive.

These notes go to press before Dr. Nelson is able to read his paper to the IES on the recent workings of the ISO/CIE Working Party, so I do not know whether or not he is going to announce an improved British headlamp design and having got at cross-purposes with him last year it is perhaps unwise to make any further remarks. However, American cars are now equipped with an improved sealed beam headlight incorporating the results of the ISO studies and samples of the new Continental design were shown at the French and British Motor Shows so I hope we shall hear how soon these blessings can be made available to the motorist in this country. The prospect of being able to see where I'm going without offending oncoming motorists is attractive and I look forward to some practical experience.



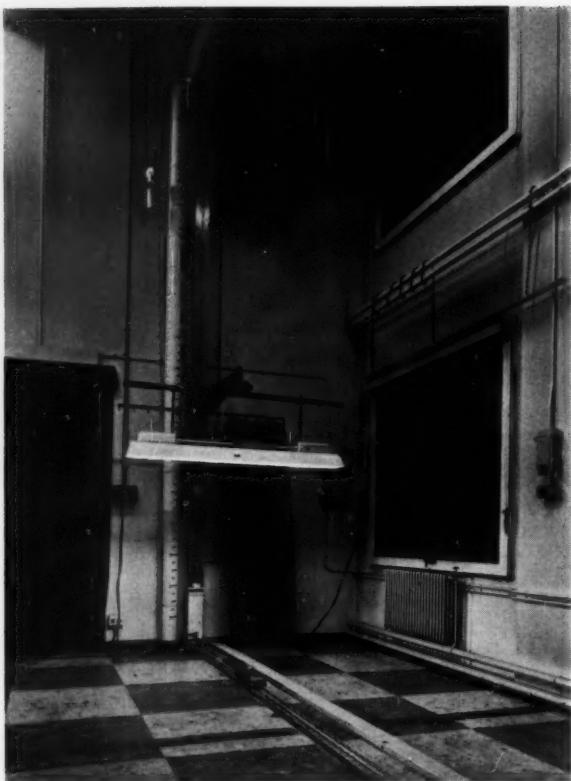
Apron lighting at London Airport, using 1,000-watt filament lamps in special units mounted at 60 ft. (GEC photo.)



Floodlit model of the Royal Palace, Baghdad. (By courtesy of J. Brian Cooper, F.R.I.B.A., and GEC.)



Mercury lighting at H.M. Dockyard, Devonport. (GEC photo.)



A mechanised photometric laboratory. (Benjamin photo.)

Interior Lighting

The same kind of influences are at work in the interior lighting field as those which I have mentioned in connection with street lighting, but they are not quite so obvious because commercial undertakings are private rather than public and their views are not usually aired annually as are those of the public lighting engineers. Thrift without sacrifice of performance is perhaps the slogan and many firms are beginning to act accordingly. SLR, I notice, offer a very reasonably priced range and the Crompton "New Range," the Thorn "Atlantic" range (366 variations), and the Falks "Cetus" range are but illustrations of the trend. Merchant Adventurers have certainly recognised the signs of the times and few will not have noticed their "Ventura" fittings designed by Paul Boissevain, which I understand are very popular both at home and abroad. There is no need to sacrifice good design to reduce cost, rather is it necessary to reduce cost by better and better design, and the "Ventura" fitting's popularity for school lighting is a good case in point. The standard of lighting in many of the older schools is much too low but finance is presumably one of the reasons for the apparent reluctance of local authorities to implement the new lighting regulations, introduced in 1954. Are we, the lighting industry, with but a few exceptions, to let the side down by offering only high-priced fittings? When the architects are making such great efforts with the natural lighting it surely behoves the lighting engineers to do more than they are doing about the artificial lighting.

I note, in addition to those fluorescent fittings mentioned above, the Thorn "Domino" range as an example which offers considerable scope to the architect who wishes to design the lighting as an integral part of the scene. I appre-

iate the obvious advantages of the modern preassembled ranges of fittings but they do, I think, tend to introduce a uniformity of lighting fitting which if carried too far would mean dullness. We wouldn't like it if every woman wore exactly the same type of dress or had exactly the same kind of hair style, would we? I do not mean to disparage the trend, which is all to the good, but let us not go too far with "Meccano"-type fittings which aspire to some artistic merit, for they may be more attractive to the maker and contractor than the user who is asked to sacrifice individuality for cheapness. There are dangers in mass-produced art.

The "tombstone" type of holder for fluorescent tubes with bi-pin caps has given way to better holders of the retractable type and Thorn have taken a limited plunge by introducing fittings for 5-ft. 80-watt tubes with bi-pin caps. Bi-pin caps may make relamping easier and take several inches off the length of fittings, so perhaps we shall see an increasing number of 80-watt tubes with bi-pin caps in the years to come. All the same, I don't think much of the bi-pins themselves and would sooner see them disappear in favour of something altogether better.

In the years that immediately followed the war, designers were rather naturally preoccupied with the more obvious aspects of lighting fittings, particularly their appearance. Now, however, they seem to have sorted out their ideas on luminaire appearance and are devoting more attention to detail, particularly any detail which leads to easier installation or maintenance. Courtney Pope are introducing lighting "spars" for shop lighting, which make for greater ease of installation and greater flexibility of the spotighting. A narrow channel is suspended a few inches below the ceiling and spotlights can be plugged in as and where the occasion demands.

Holophane have also been mindful of maintenance and have introduced a new removable box-type "Lentilite" fitting which can be easily serviced from above; I emphasise "easily" because with this new design the entire fitting can be lifted out of its seating for thorough cleaning. Such fittings will be welcomed in an interior like that of the church illustrated; it is hardly reasonable to expect a church to have a tower wagon.

The number of self-service food stores in the country is increasing and lighting is, I think, one of the features which, as it were, takes the place of the sales assistant. These stores need the help of lighting to reach the high figures of turnover at which they aim. Commercial urgency has precluded proper experiment and even now, with so many stores in operation, by no means all the lighting requirements are known. Continuous runs of fluorescent tubes are popular, with extra "perimeter" lighting to light the side shelves and walls. Spotighting is used, but so far providing a high level of general lighting seems to have been the main idea of the lighting schemes. The colour rendering of meat seems to offer special problems, and often some enhancement of the lean by means of incandescent filament spotighting or red fluorescent tubes is justified: too much filament lighting, however, is likely to increase refrigeration problems.

I was particularly interested to see "Colour Matching" tubes, above a Lumenated Ceiling, in use at the recently opened branch of Fine Fare at Brighton; colour rendering was excellent and the atmosphere not unduly cool with this colour of tube providing some 80 ft.c. The effect is as though there were a laylight overhead through which brilliant sunshine streams.

It has been argued that colour rendering is not of great importance in food shops except over the meat and vegetable cabinets, as in general only printed labels are being lighted. I, personally, cannot agree. I think the "atmosphere" created by lighting is important, and this is bound up with both the colour appearance of the light sources and the

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apparent colours and brightnesses of everything within the field of view, whether of organic or inorganic origin.

I have not heard of any notable progress during the year in regard to shop-window lighting. It is surprising that so few small shops have taken advantage of the reflector fluorescent tube, but this may only be a case of the normal time lag between marketing and general use. Certainly the lighting of the ordinary small shop window would be vastly improved if the existing bare tubes were taken out and replaced with the reflector variety. At the other end of the scale, further installations are announced of the high intensity system introduced by the GEC last year. More lumens without heat and a crisper colour is a combination hard to beat. So far, however, I have not heard any report of overseas use, so here is a chance for an enterprising exporter of shop lighting.

Benjamin Electric have brought out an elegantly simple illuminating canopy named "Teelon," which may, I think, prove attractive to those who require a fairly small well-lit area out of doors. Garages are an obvious outlet for a unit of this kind.

The trunking method of installation is becoming more popular than ever, not only in factories but also in shops and offices where it is frequently used to support a false ceiling. The false ceiling, with its ability to hide pipes and ducts and yet allow easy access, is another idea that is going from strength to strength, helped not least by Mr. Hartland-Thomas and his efforts to achieve standardisation of component dimensions.

The study of materials is obviously an important one for the lighting engineer and after the swing to plastics of the last 10 years, I sense a partial return to the more durable material, glass. Many beautiful decorative fittings in glass are coming to this country from Germany, Austria and elsewhere on the Continent; what about it, British glass makers? From the maintenance point of view I feel that glass can be better than plastic in most cases; plastics are, of course, lighter than glass, but having said this I think one has said just about all there is to say in favour of them. Nevertheless, I note with interest the new type of plastic which starts off life as thermo-plastic and after shaping is persuaded to become thermo-setting, thus permitting higher fittings temperatures. I also note the use of plastics which are immune from static.

Whilst praising glass, I must mention what may, I think, prove to be a most important development. Holophane have developed prismatic glass panels for interior fluorescent fittings; moulded panels take the place of the ubiquitous egg-crate louvre and these carry a pattern of shallow cones which act as optical louvres, directing the light downwards yet having a low luminance when viewed obliquely. It is claimed that higher light utilisation is obtained than by the usual system of box louvres, partly because the absorption of light in the clear glass is negligibly small and partly because full transmission of the light is maintained up to near the cut-off angle. These panels, which are also available in plastic, certainly have the advantage of hiding the lamps themselves whatever the angle of view, whilst at the same time restoring some sparkle to fluorescent lighting.

Before leaving the subject of materials I simply must mention pottery which is being used for lamp bases and for lampshades with very pleasing results. Pottery does not easily lend itself to mass production and I am glad that so far each base or shade has been individually fashioned by a craftsman. Many people to-day have artistic aspirations, as is evidenced by the number of students in the art schools, but how few of these will ever be able to earn a decent living by their artistic talent. I think the lighting industry

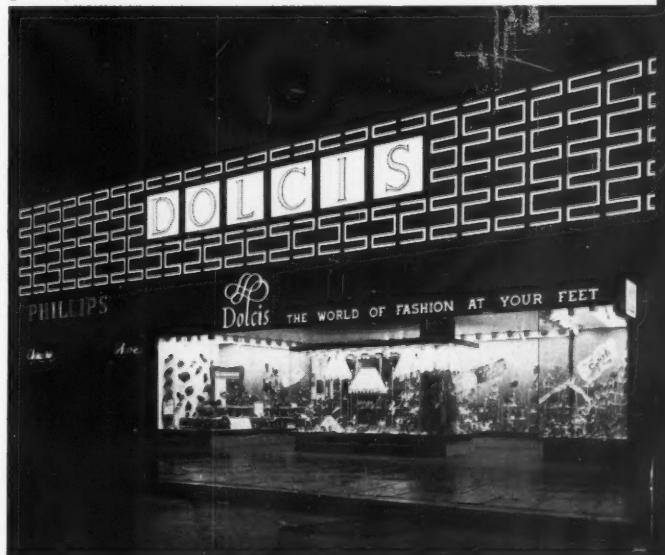


A welcome change from the economy of the square at Dorothy Perkins, Ltd., York. (Courtney, Pope (Elec.) photo.)

has more room for the artist, and I, for one, should be glad to see more artists come under its patronage.

Some years ago I did not care too much for "contemporary" fittings but now, either because the fittings have improved or my tastes have advanced, I really enjoy a good "contemporary" installation. Why, even court rooms and council chambers are going "contemporary," the newer, better, more contemporary contemporary. Simplex have even introduced contemporary well glass luminaires, weather-proof and acid-resistant, for indoor or outdoor use. The subject of contemporary styles is a very interesting one. Changes of fashion are often resisted at first but later become

Cold cathode in Oxford Street. (Courtney, Pope (Elec.) photo.)



accepted; then after a time people get tired of the new fashion and the more forward thinking elements are bringing in yet a newer one. Plain ordinary functional things like a loaf of bread or a brick do not change form very often and such things are, like the Bank of England, regarded as being among the solid permanencies of life. More vividly decorative articles like women's hats change form fairly rapidly and it seems to me that vividness and popularity-life are contradictory characteristics, like the efficiency and life of a filament lamp, between which some compromise has to be reached. So, generally speaking, I suspect that the more exciting and exotic a lighting fitting the shorter will be its reign of popularity.

It has been said that lighting should be beautiful or unobtrusive and I think the latter technique merits more consideration than it has recently received. It is often difficult to conceal a lighting fitting or even get it well away from normal lines of sight but there is another way of achieving unobtrusiveness which may one day come into fashion when the present "contemporary" enthusiasm is exhausted; it is to design the lighting fittings as an integral part of the scene and not just stick them on to a scene which from the design point of view was complete without them. It can be done in a variety of ways, elaborately as in the ceiling of the Festival Hall or simply as by a bowl of flowers lighted from underneath.

I would like to report great successes for the new system of planning a lighting scheme developed by Waldrum and described in a previous Random Review (and elsewhere) but, although quite a number of schemes have been planned by this method of "designed appearance lighting," none has actually been installed. I can, however, tell you that a "mock-up" of one very large scheme has been tried and that the result was quite up to all that had been hoped and designed for.

A design method which is not as popular as it might be is the model method. It was however used recently to design a floodlighting scheme for the Royal Palace in Baghdad and a beautiful architect's model of the building was provided for the occasion. This method is a little laborious and difficulties arise when trying to scale down the light sources, but the results are assured and the possibility of dropping a real brick somewhat reduced.

I read with interest the article in the October issue about the 400-volt 840-cycle fluorescent installation at the Wakefield Company's plant at Vermilion, Ohio, U.S.A. Surely we could do more with higher frequencies in this country.

Home Lighting

I devote a separate section to home lighting, not because I have a lot to say about it but because it is the Cinderella of lighting applications. The domestic market is a very conservative one where lighting is concerned and I think it is a great pity that so little has been done to bring new developments like the fluorescent tube into homes.

However, Thorn have made a special colourful "Kitchen-light" fitting in which a 4-ft. 40-watt fluorescent tube is operated in series with a filament lamp. The fitting weighs only 2 lb. and may be suspended from an ordinary ceiling outlet. The makers claim twice the efficiency of a 100-watt filament lamp with five times the life and as the whole fitting complete with lamps sells for £2 14s. 0d. plus 11s. 8d. purchase tax they are hoping that it will do something towards popularising the use of fluorescent tubes in the home. Installed it looks a good deal better than one might judge from a black and white photograph.

Several manufacturers are marketing "fluorescent packs" at a cost of roughly £5. Supplied complete with choke and

fluorescent tube these are, certainly as far as the large manufacturers go, the cheapest type of batten fitting produced to date. On several occasions contractors have asked me why the "Warm White" tube is supplied, as many of the fittings are purchased for kitchen use where obviously "Natural" or "Deluxe Warm White" colour would be preferred. I think these packs were produced as a simple fitting at minimum price with no particular market in mind, and it so happens that some domestic users are as ready to pay £5 for a 5-ft. fitting with a choke as £3 for a 4-ft. fitting with a ballast lamp, considering that if fluorescent lighting is indispensable in the modern kitchen they would be wise to take full advantage of the high efficiency of fluorescent tubes and have plenty of light. I certainly subscribe to the opinion that one 40-watt tube in a kitchen is hardly good enough.

I rather liked the idea Mr. Sawyer put forward at the EAW Conference at Llandudno when he suggested that manufacturers and local dealers might co-operate in circulating trial kits, consisting of, say, three modern fittings, which would enable semi-reluctant housewives to taste the comfort of better lighting and see some of the modern lighting equipment that they could have for but a fraction of the cost of, say, a refrigerator or a television set. Incidentally, why has nobody tried to sell home lighting through the mail order, high purchase, business?

Pink tinted filament lamps are of course aimed largely at the domestic market and having given them a trial in my own home I hope that they will attain the popularity they deserve. It is quite true that some 25 per cent. of the light from the filament is lost but we have for years cheerfully accepted much greater losses from quite deeply coloured shades. In effect we are now doing inside the bulb more or less what we have been doing outside the bulb for years.

I note the suggestion that dimmers might be used in the home, as for night lighting in children's bedrooms. We certainly need some means of dimly lighting certain parts of the home at night. This brings to mind, rather unexpectedly, the lighting of the new hall at the Northampton Polytechnic in London where very handsome circular fittings provide a nice soft lighting adequate for meetings and social events. Each fitting, however, has a powerful spotlight type of fitting within it which when switched on increases the illumination at desk level for examinations. I wonder whether composite fittings of this sort could be designed for domestic use. For example, a fluorescent fitting, with a spotlight which could be switched on for reading purposes by pulling the cord of a ceiling switch beside the fireplace, the spotlight being adjustable and, of course, louvred so as not to be glaring to others in the room.

While on the subject of domestic lighting I would like to join with the many who have been clamouring for the provision in new houses of sufficient socket outlets. The increasing use of electrical equipment in the home calls for quite a large number of electrical outlets; without them flex will be trailed about all over the house which apart from being unsightly may become dangerous, especially to young children.

Miscellaneous

I nearly relabelled the earlier section on street lighting "exterior lighting" because the need for more and more productivity is making more and more night work necessary, particularly as regards transport of various kinds. Increasing effort is being devoted to the lighting of railway yards, docks and yards where motor transport operates, not to mention areas where aircraft load and unload. As illustration, I have included photographs of the apron at London Airport, the lighting unit for which I described last

year, at HM

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year, and a new installation of specially designed fittings at HM Dockyard, Devonport. The latter installation is interesting because the job was tackled from first principles and much care was taken to satisfy as far as possible the rather unusual lighting requirements. Each fitting houses two horizontal 400-watt mercury lamps, and there is adequate lighting without obstruction and without undue glare to the crane drivers. The fittings are mounted at 35 feet and set back 50-70 feet from the quayside. Outdoor lighting in hazardous areas, as near petrol stores, is receiving attention, and I note a flameproof, aero-screened lantern by Holophane for this purpose.

Not so many years ago photometricians were crawling about on the floor, pushing photo-electric cells before them. To-day, however, mechanisation if not automation is making life far more comfortable, enabling far more work to be done, and done more accurately, by fewer people. Photometric data can be obtained quickly with the aid of such equipment as that shown in the photograph of the laboratory of Benjamin Electric; here one person can move the fitting, move the photo-electric cell and record readings without moving from his chair. Mechanisation like this coupled with data gathered from field experience is greatly simplifying and speeding installation planning. I do not, however, wish to imply that lighting design is becoming mere routine; nearly every job has some special feature and to some extent every job must be treated on its merits. Mechanisation and experience can do away with the drudgery but there is always room for the bright idea and the good helping of common sense.

Colour matching was brought into focus when Miles and Peach read their paper on the subject to the IES in

March. Of particular interest is the fact that fluorescence is now being so widely used to enhance the appearance of paper, textiles and other things ("— adds brightness to whiteness") that in many cases to-day a suitable near ultra-violet component is required of sources for colour matching as well as the visible radiation. This need is being met by the inclusion of "black light" (UV) fluorescent tubes in the unit.

Conclusion

Paper, paper, paper, journals, leaflets, pamphlets, advertisements, transactions, minutes, circular letters: is there no end to the printed matter one is expected to read? I admire those who can read at 600 words a minute, but even if I could read as fast as this I doubt whether I could find time to do justice to all the printed matter that comes into my IN tray. A colleague of mine has just complained that he is not on certain mailing lists; I had to point out that if he were to go on too many mailing lists he wouldn't have time to do any work. Technical or commercial reading is, like alcohol, something which must be taken in moderation, kept in its place, as it were, and not allowed to consume too much of our time.

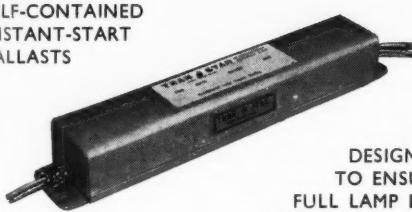
If you, dear and valued reader, have got this far take pity on your colleagues and put this journal in the waste-paper basket, reflecting that if they have kept up with all the year's literature there is no occasion for them to read this. You could, alternatively, suggest to the Editor that, with A Random Review once a year, there is no need for the other 11 issues of *Light and Lighting*. But don't tell him where the idea came from.

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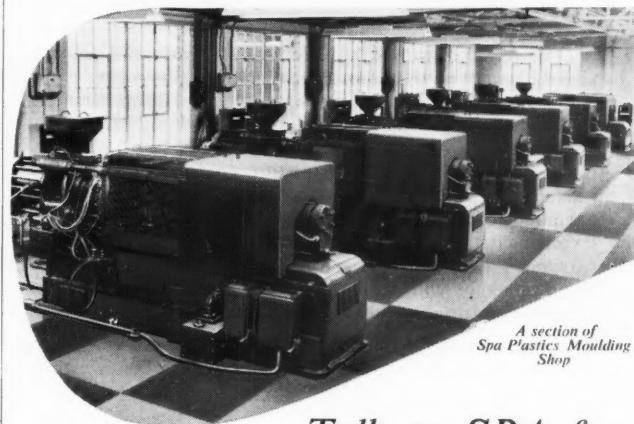
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Lighting Abstracts

OPTICS AND PHOTOMETRY

- 380. Measurement of automobile headlighting.** 535.24
 R. ASPESTRAND, *Ljuskultur*, **28**, 73-74 (July-Sept., 1956).
In Norwegian.

A report of a joint meeting of the Norwegian Lighting Society and the Royal Norwegian Automobile Club on the measurement of light from automobile headlights. The requirements of a suitable photometer are, that it should be capable of giving quick measurements, by day or by night, indoors or outdoors, transportable, accurate to 10 per cent., and work at as short a distance as possible from the car.

R. G. H.

- 381. The viewing of cinema screens.** 612.84
 LESLIE KNOPP, *Trans. Illum. Eng. Soc. (London)*, **21**, 199-205 (No. 8, 1956).

Discusses established viewing standards for commercial cinemas in relation to the various cinematograph techniques now in use. Types of directional screens are described, including some experimental screens. The theoretically optimum viewing distance is indicated, and this is compared with actual viewing distances imposed by the unalterable shape of existing cinemas. It is shown that although wide-screen techniques require a closer approach to the screen for correct viewing, the photographic quality of the projected picture has been much improved by reduction printing.

W. R.

- 382. The viewing of television screens.** 612.84
 R. D. NIXON, *Trans. Illum. Eng. Soc. (London)*, **21**, 205-216 (No. 8, 1956).

The paper discusses the available contrast ratio on television screens of the aluminised and non-aluminised types, and indicates the reduction in contrast due to direct illumination of the dark portions of the picture by the bright portions, halation in the glass envelope and external illumination. The results show that picture contrast ratio may be reduced by these effects from about 150:1 under the best conditions to 25:1 under typical domestic viewing conditions. Experiments in television picture viewing with illuminated surrounds are described, and curves are given relating picture luminance with the surround luminance giving greatest viewing comfort, for three sizes of surround.

W. R.

- 383. The viewing of radar screens.** 612.84
 S. T. HENDERSON, *Trans. Illum. Eng. Soc. (London)*, **21**, 216-221 (No. 8, 1956).

Discusses the problem of room lighting for radar-screen viewing and describes early attempts to provide occupational lighting without serious reduction of screen visibility. A new system is described using near-white ambient light from a combination of fluorescent lamps covering almost the entire visual spectrum apart from a band in the region of the cathode ray tube emission. A colour filter in front of the cathode ray tube passes the screen emission but absorbs the lamp emission so that a minimum of external light reaches the screen.

W. R.

LAMPS AND FITTINGS

- 384. Polarised headlight filters.** 535.8
 V. J. JEHU, *Trans. Illum. Eng. Soc. (London)*, **21**, 149-159 (No. 7, 1956).

Describes the polarised headlight system and discusses the relative merits of three commercially available filters

for use in this system. The effect of the accuracy of polariser settings and of windscreens material on the effectiveness of the system is discussed and it is shown that the use of polarised light would necessitate a laminated windscreens unless optically inactive toughened glass could be produced.

W. R.

- 385. Some polarised headlight systems.** 535.8
 V. J. JEHU, *Trans. Illum. Eng. Soc. (London)*, **21**, 160-167 (No. 7, 1956).

Discusses widely different proposals put forward in America and Germany for the use of polarised headlights and records the results of tests using an alternative system. It is pointed out that neither the American nor German system would be easy to introduce since the immediate benefit would be small. Driver appreciation tests are described using polarisation of existing driving beams and it is noted that this system does not illuminate the road near the vehicle well enough to inspire confidence and that silhouette vision is seriously reduced. Preliminary experiment suggests that both criticisms might be overcome with an in-part polarised system in which the near view is illuminated by unpolarised light and the distant view by polarised light.

W. R.

- 386. Fluorescent lamps.** 621.327.43
 S. HESSELGREN, *Byggmästaren*, **35**, 170-176 (A8 1956).
In Swedish.

The physics of the production of light is briefly discussed as an introduction to the special problems which arise from seeing by fluorescent light. The phenomenon of "colour constancy" is discussed in relation to the probable acceptable limits of change from a "black body" to a discontinuous spectrum. The lines on which further experiments should be conducted are discussed.

R. G. H.

- 387. Relative brightness of coloured light sources.** 612.84
 H. M. FERGUSON AND W. R. STEVENS, *Trans. Illum. Eng. Soc. (London)*, **21**, 227-247 (No. 9, 1956).

Describes experiments comparing the apparent brightness of mercury and sodium light sources over a wide range of luminances and a formal street lighting test to compare subjective preferences for similar installations of sodium and mercury. Results from laboratory experiments showed that 90 per cent. of observers found mercury more dazzling than sodium of equal luminance while the street tests showed that the preference for sodium compared with similar mercury street lighting is only small. The results are discussed in relation to the standard photometric scales and with regard to installation characteristics such as column spacing and types of lanterns which tend to bias opinion in favour of sodium street lighting.

W. R.

- 388. Efficiency of a lighting fitting when used with lamps whose flux output varies with temperature.** 628.93
 W. SCHMIDT, *Lichttechnik*, **8**, 386-388 (Sept., 1956).
In German.

Criticises the proposals made by Reeb and Dittrich (see Abs. 318, Sept., 1956) for defining the efficiency of a lighting fitting as the ratio of the emitted flux to that given by the lamp at the temperature at which it runs inside the fitting. The author points out that the latter quantity is subject to

various sources of error and, further, that the temperature of the choke influences the light output under running conditions. He prefers the ratio of the emitted flux to that from the lamp when running at a specified temperature, e.g., 25 deg. above ambient. He suggests, in addition, that the lamp flux should be measured by removing the lamp from the fitting (or one lamp at a time when there are several) and running it from the choke when this is at the operating temperature. There is a long reply, with a further discussion of the matter, by Reeb and Dittrich. J. W. T. W.

LIGHTING

628.972

389. Factors causing variations in judgment of fabric.

M. M. TAYLOR, *Jour. Textile Inst.*, 47, 411-458 (June, 1956).

The assessment of quality of textile fabrics is a matter of judgment and it varies on account of personal as well as objective factors, especially lighting. These factors are very thoroughly discussed, but the major part of the paper is concerned with the variation in sighting conditions due to prevailing methods of natural and artificial lighting. A strong plea is made for the standardization of conditions of lighting for fabric inspection so as to eliminate some of the most important variables which now tend to make assessment of quality capricious. This means that sighting would have to be done only in artificial lighting and a specification is needed covering the essential features of a suitable system of lighting. The paper is well illustrated and is based on a thesis which gained the Insignia Award of the City and Guilds of London Institute. H. C. W.

390. Lighting on the Champs-Elysees.

628.971.6

Lux, 24, 70-74 (July-Sept., 1956). In French.

Describes the new lighting of the Champs-Elysees, Paris, and the tests which were made to decide the method of lighting. The existing short columns are retained, fitted with a small mercury fluorescent lamp and a small tungsten filament lamp. The new lighting is provided by double lanterns with ellipsoidal mirrors, one facing the carriageway and the other the gardens, provided respectively with a 250-watt mercury fluorescent lamp and a 500-watt tungsten lamp, and a 125-watt mercury fluorescent lamp and a 300-watt tungsten filament lamp. Fluted steel columns are used, with double curved steel brackets with an outreach of 15 ft.; the two lanterns are carried in adjustable cradles. The base of each column houses the gear for the lamps on that column and also that for the lamps in the two adjacent small columns. The mounting height is 7m. 50 (25 ft.) and the spacing 22-28m. (67-85 ft.). The carriageway is 85 ft. wide. J. M. W.

628.971.6

391. Progress in street lighting with fluorescent lamps arranged longitudinally.

C. LOEF, *Lichttechnik*, 8, 337-339 (Aug., 1956). In German.

There has been much discussion in Germany as to the relative advantages of the transverse and longitudinal arrangements of fluorescent lamps in a street. The latter is less glaring but requires closer spacing for equal uniformity of illumination. The author points out that while the glare is insignificant in main streets with much extraneous light from shop windows and signs, it is important in a traffic route with little or no other light than that from the street lamps, and in such cases the longitudinal arrangement should be adopted. With ordinary fittings the spacing/height

ratio has to be low, generally not greater than about 2.3. He describes a special fitting, giving a more oblique distribution in the plane containing the lamp axis, with which the spacing/height ratio can be increased to about 3.

J. W. T. W.

392. Daylight in schools.

628.92

B. HIDEMARK, *Byggmästaren*, 35, 19 (A3, 1956). In Swedish.

A review is given of an extensive series of model studies undertaken at the Royal Institute of Technology, Stockholm, on the effect of size and distribution of windows, reflector factor and colour of interior surfaces, room dimensions, etc., on the amount and distribution of daylighting in school rooms. The complete report can be obtained from the Swedish Committee for Building Research, Stockholm.

R. G. H.

393. Traffic lighting.

628.971

I. FOLCKER, *Ljuskultur*, 28, 63-67, (July-Sept., 1956). In Swedish.

The fundamentals of street lighting and vehicle lighting are discussed. Satisfactory lighting depends on many factors, of which the average speed of the traffic and the traffic density are highly significant. These factors can be used to group roads into categories, each of which requires a different level of lighting to be adequate for its purpose. These levels are specified in terms of average level and diversity of illumination on the road (not on luminance), as determined from current German practice. R. G. H.

394. Restaurant lighting.

628.972

C. B. HOLMBERG, *Ljuskultur*, 28, 55-61, (July-Sept., 1956). In Swedish.

Restaurant lighting needs to be carefully planned in relation to the character of the establishment. Crystal and prism chandeliers are recommended for a festal character with additional indirect lighting, and each table should have its own lamp, but there are few rules that can be laid down for general application. Various ideas are illustrated for different types of Swedish restaurant. R. G. H.

395. Some street lighting in Marseilles.

628.971.6

M. TURIN, *Lux*, 24, 79-81 (July-Sept., 1956). In French.

Describes a number of street lighting installations, some of novel design, using mercury fluorescent, tubular fluorescent and sodium lamps. Interesting results have been obtained by the use of strips of four fluorescent lanterns with single tubes, arranged transversely similarly to some German installations. Another interesting installation has been made at the Quai du Port, where a wide carriageway is flanked by a wide promenade; both are lighted by sets of four fluorescent lanterns on columns on the kerb dividing the two. Facade lighting has been used in a fairly narrow road. Sodium has been used for highways and for floodlighting. J. M. W.

396. New public lighting in Tours.

628.971.6

J. BOUBEL, *Lux*, 24, 77 (July-Sept., 1956). In French.

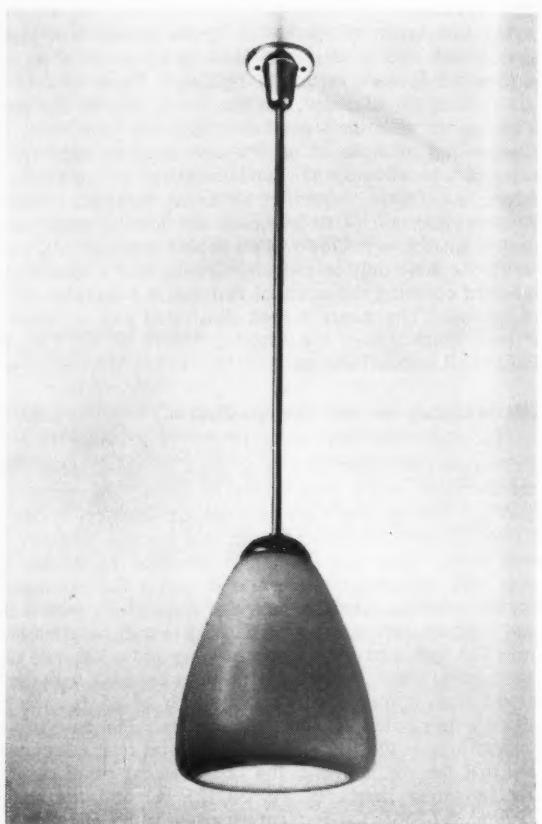
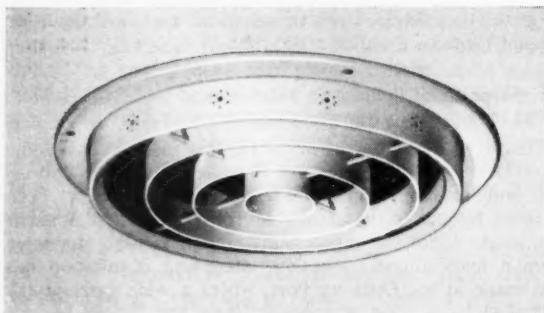
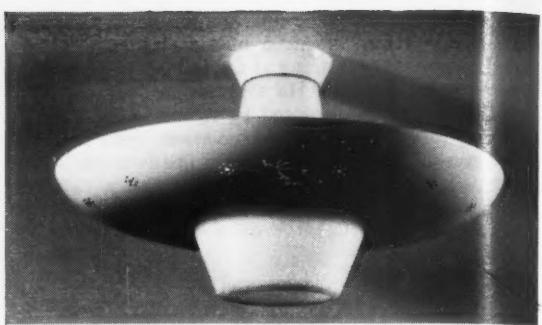
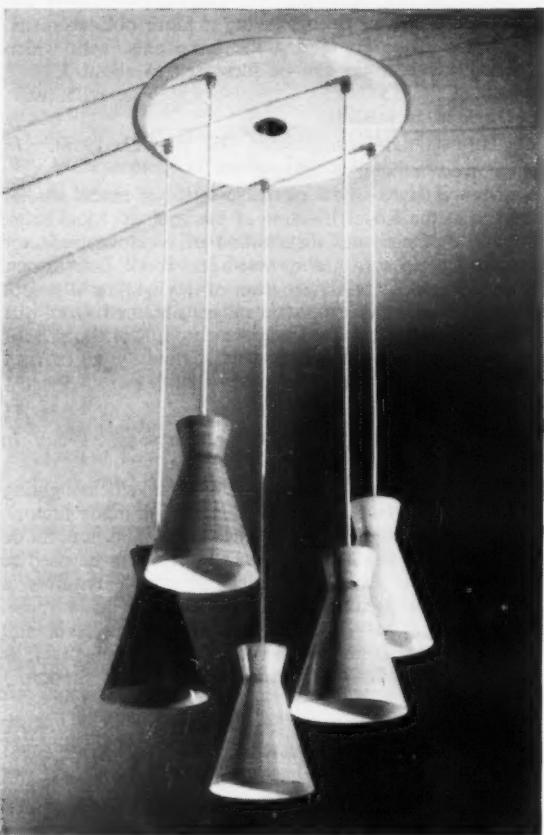
Describes new lighting installations using mercury fluorescent lamps, from 125- to 400-watt, in enclosed lanterns housing the ballasts. The relative advantages of open and enclosed lanterns are discussed. J. M. W.

397. Illuminations in the Val de Loire.

628.971

Lux, 24, 82-85 (July-Sept., 1956). In French.

Illustrations and some technical details of the floodlighting used for the "Spectacles de Son et Lumière" at Chambord, Chenonceaux and Cheverny. J. M. W.



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HOME LIGHTING

An investigation in six parts by Derek Phillips, M.Arch. (M.I.T.), M.C.D., B.Arch. (L'pool), A.R.I.B.A., into the relationship between architecture and lighting in the modern home.

PART 1 - - - - INTRODUCTION

It is typical of developments in the lighting of buildings that they should lag behind those in other fields, so that to-day we have the anomaly of seeing buildings of advanced design technically and aesthetically, in which the artificial lighting is still related to the "gas age." It is the aim of this series of articles to draw to the attention of architects, as much as to lighting engineers, the relationship between lighting and house design, as it affects Man's home environment and the formal unity of house design.



"The extended view . . . a feeling for space not bounded by four walls."

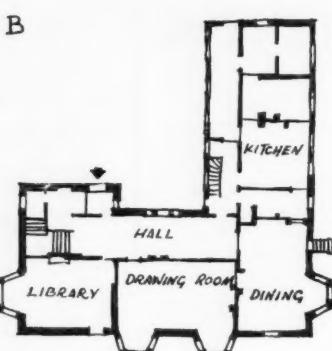
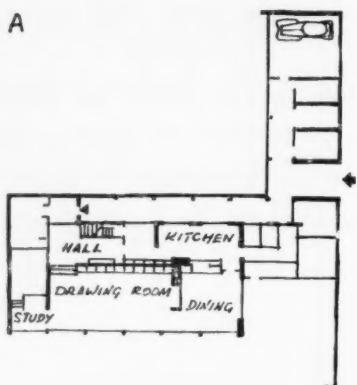
THE "Modern Movement" in architecture, as crystallised by the pioneering work of Le Corbusier in France, Gropius and others in Germany, and Frank Lloyd Wright in America, has changed the concepts which govern the design of homes in many ways. In England, for example, those homes of the 1930s which are typified by the Halland House (designed by Serge Chermayeff) and the blocks of flats Highpoint 1 and 2 (designed by Lubetkin and Tecton) have had a profound effect on present-day houses and flats, so that even some of the homes now built by local authorities include features which were considered revolutionary 20 years ago.

These changes in house design can be classified roughly under the headings "aesthetic" and "technical," though there is an inter-relationship between the two. For instance, the desire for clear open space might be said to have dictated the need for long-span beams, though it was the fact that these beams were already in use in other buildings that provided the technical means for carrying out the architect's design. There was, in fact, an inter-action between ideas and techniques, producing a new aesthetic which, in turn, demanded still further technical means.

The aesthetic changes in home design can be summed up under the general heading of "free planning." The Victorian concept of a room for each use—a withdrawing room, a dining room, a study, library, sewing room, breakfast room, kitchen, etc.—has given way before modern economics, and modern spatial concepts, to a less clear statement between the various areas of a house, in terms of solid dividing walls. This change has led to the use of one space for several purposes. The bedroom often becomes a bed-sitting room, while the living-room is used for a wide range of activities. In fact, flexibility of use is inherent in the notion of the free plan.

The free plan presupposes, moreover, the "extended view" and a feeling for space, not bounded by four walls, but more loosely defined by changes in floor and ceiling finishes, by units of built-in furniture, by curtains, and by variations in ceiling level. A further extension of this visual freedom has been the "explosion" of the outside wall of the house and the use of large areas of glazing reaching from floor to ceiling in uninterrupted planes.

A desire for simple wall surfaces, unadorned by the *pastiche* of previous architectural styles, has developed, and a new regard for the materials from which buildings are made—brick, stone, glass and wood—has followed. The quality of surface texture—smooth, rough and

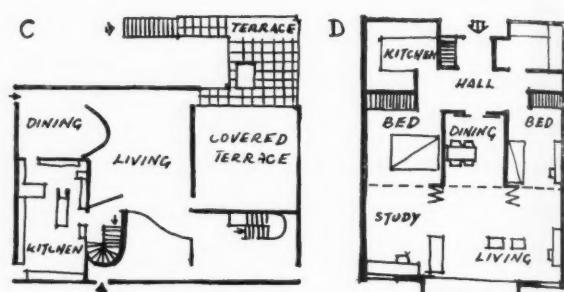


Left, the Halland House (1938) (A) compared with a house of the 1890s (B). Note the similarity in the arrangement of the rooms, but the absence of solid dividing walls in the 1938 example. Below, a house designed by Le Corbusier during the 1930s (C) compared with a flat designed by Chamberlin, Powell and Bon in 1956 (D).

figured—has become an important element in architectural composition, and with this renewed interest in materials and surfaces has come a more positive approach to colour and the effects on form which can be gained by its use. Colour plays an important part in the modern home interior, and its skilful use when large, old buildings are converted into several small living units can mitigate the defects in proportion and scale which so often result.

Another aspect of free planning is the creation of a closer relationship between indoor and outdoor space, so that the house is no longer thought of as something alone and apart from its surroundings. Instead, the house allows the garden to "penetrate" into its interior, and goes halfway out to welcome it. This effect is brought about by the use of floor textures which are common between the two areas; by the use of large areas of plate glass which, functioning mainly as a temperature barrier, allow the feeling of space to "flow" in both directions; and by the current preoccupation with indoor plants.

The wall is no longer thought of as something solid, in which holes are cut to a pattern predetermined by the exterior view and dictated by classical ideas of symmetry. A careful balance is struck between solid and void, taking into account functional as well as aesthetic needs and giving as much attention to the appearance from inside as to the composition of the façades. The whole arrange-

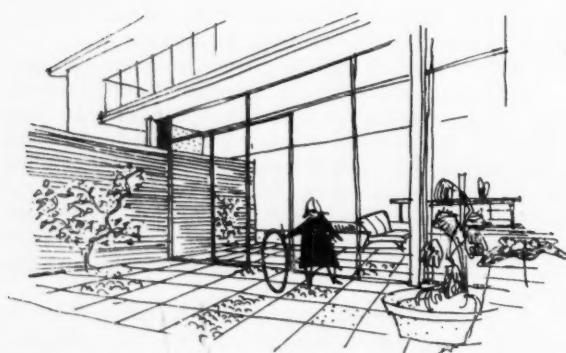


ment is, in fact, aimed at a unity of indoor and outdoor space.

The technical changes that have taken place include the following:

- (i) The more widespread use of central heating, instead of open fires, with their accompanying draughts, allows space to be used more freely. When all the space is at roughly the same temperature, it is no longer necessary to erect within the home solid barriers to the path of heat.
- (ii) The application of modern methods of construction to house- and flat-building can relieve the external walls of structural significance and minimise the number and size of internal supports, thus making possible walls of glass, sliding walls, and other non-structural forms of partitioning. Similarly, lightweight flexible screens can be used or, where required, internal divisions can take the form of bookcase or cupboard units, which, if they do not reach to ceiling height, allow the ceiling to appear as an uninterrupted plane from one space to another.
- (iii) The use of "new" materials, such as reinforced concrete or lightweight laminated timber, which in themselves create new visual concepts, can bring about further modifications of the house interior, with, for example, space "flowing" upwards from rooms at one level to rooms above.

Many of these techniques are, of course, new only to the home. Similarly, there are many lighting techniques which have long been in use in other buildings and are readily available for domestic interiors. It is true, however, that when they have been used in the home these techniques have often been wrongly applied. But this does not mean that they are inappropriate for domestic use; on the contrary, the form of the contemporary interior definitely calls for these techniques and where they



"The house allows the garden to penetrate into its interior, and goes halfway out to welcome it."

have been used intelligently some excellent effects have been achieved.

If a wall surface is to be treated as a simple plane from floor to ceiling which, in conjunction with other simple shapes, produces a satisfying three-dimensional composition, it is important that this composition should not be spoilt at night by ill-considered lighting. Techniques and equipment, such as long-line sources of good colour characteristics, are available which can enable the designer to preserve these effects or, should he choose, to modify them *positively* to create new and different effects. But the use of such techniques depends on the architect's appreciation of the full possibilities of lighting. They can seldom be exploited if the architect leaves the lighting to his client, considering his own task completed if he has provided a certain number of electrical outlets at various points on the plan.

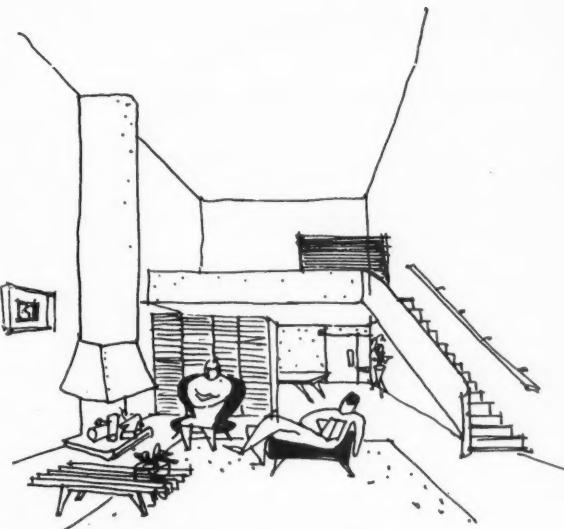
Lighting equipment now at the architect's disposal includes new forms of light source, such as the various types of fluorescent lamp, the infra-red lamp, high- and low-wattage tungsten lamps and, for special purposes, such as garden lighting, mercury and sodium lamps. There are also many new diffusing materials, including various plastics, which make "large-area" sources an economic proposition.

New methods of electrical distribution, such as the ring-main system and low-voltage control, assist in making lighting layout more flexible, so that alterations and additions can be made more easily, and equipment is available which can make the lighting variable. For example, switches incorporating dimmer circuits make it possible to alter the illumination level, while special apparatus can be used to produce changes in colour. Then there are, of course, the various lighting fittings with movable parts, which facilitate changes to the "geometry" of the installation.

Perhaps the most important development, though it may be the one least widely appreciated, is the relative cheapness of artificial light. At current rates, the cost of light is a negligible item in the family budget, and there is little doubt that much more light would be used if this fact could be brought home to more people. It is not uncommon for people who heat their homes by electricity, thus using several kilowatts an hour, to dislike leaving on an unnecessary 60-watt lamp which can run for several hours for a fraction of a penny.

The lack of good lighting in many homes is undoubtedly due largely to the high cost of installation and equipment, for it cannot be denied that initially a good scheme costs more than a bad one. Lighting is something about which the layman knows very little; he is, therefore, not easily persuaded to pay more for it than is absolutely essential. Knowing this, architects tend to treat the cost of good lighting as an "extra," instead of part of the building costs. Like a mural or built-in furniture, the lighting is something that can readily be cut if the tenders turn out to be too high. It would be a different matter if the architect said that he intended to economise by leaving out some of the windows: the need for sufficient windows is universally accepted, yet the need for good artificial lighting is no less important.

Apart from their places of work, men spend more time in the home than anywhere else, while women spend an even greater proportion of their time there. We need variety in our visual environment, just as we need variety in our food or forms of recreation, and lighting provides



"Space flows upwards from rooms at one level to rooms above."



"Fittings with movable parts . . . facilitate changes to the 'geometry' of the installation."

one of the simplest methods of modifying an environment. Contemporary concepts of house-planning and space utilisation make it essential that the lighting of the various spaces should be flexible enough to satisfy many different needs; in solving this problem the designer of a lighting scheme can, at the same time, not only help to prevent "eyestrain" and visual boredom, but contribute much towards the richness and unity of the architectural design.

Correspondence

The Illuminating Engineering Society

Dear Sir,—Members of the IES have recently been told that the Council has been considering for two years a proposal to change the Society's title. This coupled with the favourable publicity in your columns may have led other members to think that the Council and Centres were unanimous in this matter.

I can say, not only is the Glasgow Centre Committee opposed to the change, but that the general consensus of opinion in the Centre is that the new title is neither necessary nor desirable, involving as it will loss of good will, particularly so near the Society's Golden Jubilee.

By lighting, the layman understands no more than the relief of darkness; but to him, illuminating means doing so correctly and appropriately, particularly if he has seen Blackpool illuminations.

Certainly there are physicists, chemists, architects, ophthalmologists who have contributed to the advance of modern illuminating engineering. This has been so in other branches of engineering, but the other engineering organisations have always proudly retained reference to engineering in their titles, because it represents truly the results of all these diverse efforts. Illuminating engineering has come into its own and to-day involves more than the provision of a specified value on the working plane, particularly now that we have the Inter-reflection and Designed Appearance Methods coupled with Glare Factors.

Propagandists tell us that the American Society is about to change its title; as a member of that society, I have yet to see this in print.

One hears that about a dozen alternative titles have their proposers; this just shows that if everybody is to be satisfied we shall never have a settled society. "Lumeritas" said that he would be surprised if there was not a substantial majority in favour of the change. Who knows, he may have been surprised already.

Members will, I am sure, agree when I say to the Council, if there was not a substantial majority for a change, abandon the idea or face the consequences of a controversial action. I ask members to remember the incomplete job an earlier Council did when it set up the Register, without full thought, and to press them to clear up this earlier matter.

To "Lumeritas" I would add that Dip.I.E.S. does not offend any prior user; can the same be said for F.L.S.?

So members, stand firm, do not be persuaded to change unless you are really sure.

Gourock.

RONALD CROFT.

Street Lighting Columns

Dear Sir,—After reading numerous ill-advised and ill-founded articles on the subject of Concrete Lighting Columns it is indeed refreshing to read a well-balanced commentary such as the editorial which appeared in the October issue of your journal. My company was one of the first to manufacture this item of street furniture and we now supply many thousands of reinforced and prestressed concrete columns annually.

Helpful criticism is something we welcome, but it is exasperating to be confronted from time to time by the views of a minority who have no regard for so many factors of importance. These critics appear to disregard the technical and functional considerations which the manufacturer and user alike have always to take into account and which appreciably affect column design.

For a number of years a considerable amount of time and thought has been devoted to the development of lighting columns so as to produce a range of standard designs to harmonise with different types of surroundings. Consequently, there are now available many approved designs of reinforced and prestressed concrete lighting columns which have been produced as the result of prolonged study and

experiment. The columns and brackets supplied by my company have received the approval of the Council of Industrial Design or been passed by the Royal Fine Art Commission. They are suitable for all conditions and, a very important feature, show considerable savings in valuable raw materials and maintenance.

Let us hope that the local authorities, advised by their lighting engineers, will be allowed to make their own selection of the equipment suitable for the job in hand without having to submit to the wishes of any vocal few who wish to inflict their views on the majority.

L. RAWLINS.

*The Stanton Ironworks Co., Ltd.,
Nr. Nottingham.*

Glaucoma and Lighting

Dear Sir,—My attention has been drawn by several members of the IES to an article in a publication called *The Dispensing Optician*, in which an introductory reference has been made implying some connection between that dread ocular complaint glaucoma and "modern lighting."

I see from the current issue of *Light and Lighting* that "Lumeritas" makes reference to this matter, and deals quite adequately with this rather peculiar reference.

Any form of lighting, ancient or modern, has of course no causative relation to the onset of an attack of glaucoma, nor will its influence affect the prognosis of any such case either one way or the other.

It may be of interest to readers to note that in "border-line" cases I find it a valuable aid to the diagnosis of incipient glaucoma if the patient's colour discrimination is tested by means of suitable pseudo-isochromatic plates.

Preston.

SYDNEY MOUNTAIN.

Trade Literature

A.E.I. LAMP AND LIGHTING CO. LTD., 44, Fitzroy Road, London, N.W.1.—A well-designed and illustrated catalogue giving full details for shop and display lighting introducing a new range of lighting fittings specially designed for shops, stores and exhibitions.

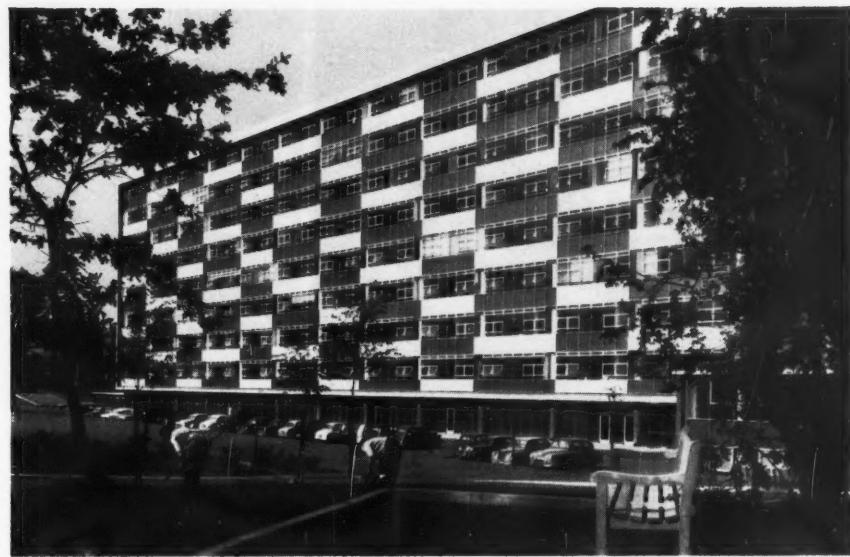
LINOLITE LTD., 118, Baker Street, London, W.1.—Catalogue No. 28, illustrating fully this company's strip reflectors, fluorescent reflectors, moulded fittings, signs, metal fittings and contemporary shades as well as the recently introduced picture reflector unit.

PHILIPS ELECTRICAL LTD., Century House, Shaftesbury Avenue, London, W.C.2.—The first number of a new publication entitled "Lighting Application Bulletin" which deals with lighting for grocery and provision shops. This is a four-page, two-colour publication which illustrates a completed scheme together with the types of lamps and fittings designed for specific applications.

STRONG ELECTRIC CORPORATION (GREAT BRITAIN) LTD., Whyteleafe, Surrey.—New well-illustrated catalogue giving full details and prices of several types of fluorescent fittings for industrial and commercial use.

SYLVANIA ELECTRIC PRODUCTS INC., 1,740, Broadway, New York, 19, N.Y., U.S.A.—A new illustrated brochure giving details of the "Mohawk" lighting system especially designed for modern low ceilings in such places as schools, offices, public buildings, conference rooms, etc. Also a new 20-page booklet describing "Sylvan-Aire," a system of wall-to-wall lighting, and giving details of installations in stores, offices, schools, banks, factories, laboratories, hospitals, art galleries, conference and reception rooms, etc. A booklet on mercury vapour outdoor lighting illustrating its use in service stations, athletic fields, golf courses, gardens, etc. Also a four-page brochure depicting new light control for stores and industry through the new directional reflector fluorescent lamp especially designed for the commercial and industrial market.

Architects, J. L. Martin, M.A., Ph.D., F.R.I.B.A. (former Architect to the L.C.C.), F. G. West, A.R.I.B.A. (Deputy Architect), the late S. Howard, L.R.I.B.A. (former Schools Architect), G. F. Horsfall, M.B.E., B.Arch., A.R.I.B.A. (Assistant Schools Architect), and J. M. Kidall, A.R.I.B.A. (Architect-in-Charge); electrical consultant, J. Rawlinson, C.B.E., M.Eng., M.I.C.E., M.I.Mech.E. (Chief Engineer to the L.C.C.); general contractors, Leslie and Co., Ltd. (foundations) and Rush and Tompkins, Ltd. (superstructure); electrical installation, H. J. Cash and Co., Ltd.; lighting fittings supplied by Hume Atkins and Co., Ltd., Merchant Adventurers, Ltd., and Fredk. Thomas and Co., Ltd.



L.C.C. Comprehensive School for Boys, at Tulse Hill

At the beginning of the current school term no fewer than 12 new secondary schools were opened in the London area, most of them designed by the London County Council's own architects department (former architect to the Council, Dr. J. L. Martin; schools architect, the late Mr. S. Howard). These schools provide accommodation for about 18,000 pupils between the ages of 11 and 18. Perhaps the most interesting of them is the Tulse Hill comprehensive school, Lambeth, which caters for 2,200 boys, and is mainly remarkable for being mostly nine storeys high—making it probably the tallest school yet built in the United Kingdom.

THE reason for the height of this school is that the 8.4-acre site is about $3\frac{1}{2}$ acres smaller than the Ministry of Education would normally require for a school of this size. By building upwards, the amount of the site occupied by the school buildings has been minimised. There is a gentle slope to the north and many fine trees have been retained and incorporated in the site layout.

The nine-storey block contains most of the general teaching rooms, the library, art and pottery rooms, and all laboratories. This accommodation is disposed around four staircase and lift towers, each lift being large enough to carry a whole class. Most of the circulation is therefore vertical, there being horizontal communication corridors only on the first, fourth and seventh floors. By this method of planning, a substantial economy in floor area was achieved.

The whole of the ground floor of the nine-storey block is occupied by cloakrooms and lavatories; adjacent to it and reached via a short link block is the assembly hall, which serves also as a dining hall and as an arena for

dramatic performances. It has a raked floor and can accommodate at one time three-fifths of the school's pupils. On one side of the hall is the kitchen and servery; on the other, the staff rooms, headmaster's office and medical suite.

Workshops (the school is a combined grammar school, technical college and secondary-modern school) are in a separate block, with north-light roofs, and the five gymnasias also form a separate entity, to the north of the main block and reached by a covered way.

Construction generally is of reinforced concrete, much of which was prefabricated on the site. Spun-concrete pipes were used as permanent shuttering for the columns, in addition to which only the main cross beams, which are at 23 ft. 4 in. centres, were cast *in situ*. The remainder of the framing, including edge beams, secondary beams, and the 14-in.-wide T-section floor units which span the 8 ft. between the secondary beams, were pre-cast and hoisted into position by tower crane.

The two main façades of the nine-storey block are clad with glass curtain walling, which is carried, storey



by storey, on steel angles bolted back at each level to the concrete edge beams. The two end walls are of 6-in.-thick concrete faced with Portland stone. Internal partitions are of "Bellrock" floor-to-ceiling units, which were made by the contractor on the site.

The large measure of prefabrication adopted brought about speedy erection. A number of special appliances were designed to facilitate the handling of the precast elements, and each storey was erected in three to four weeks. All the services were pre-planned, so that holes could be cast in the beams for them, and plugs were cast-in for fixings.

The workshop block is constructed of precast concrete portal frames, with north-light roofs of light steel angles, bolted to the concrete framing and supporting asbestos-cement sheeting, which is lined internally with fibreboard. External walls are of stock bricks; internal walls, which were left fair-faced, of sand-lime bricks.

The five gymnasia have monitor-type roofs supported by cranked castellated steel beams. The flat portion of the roof comprises T-shaped concrete units, as used for the floors and roof of the teaching block. The assembly hall and the adjacent rooms have conventional reinforced concrete framing, with brick in-filling panels, the centre portion of the hall itself being spanned by light welded-steel trusses.

Floors are mostly of thermoplastic tiles, with cork tiles in the library, "Iroko" hardwood blocks in the wood-working shops, the assembly hall and on the stairs, "Gran-wood" blocks in the metalworking shops, and maple strip (on a sprung base) in the gymnasia. Ceilings in the teaching block are of $\frac{1}{2}$ -in. fibreboard, suspended from and secretly fixed to steel angles. Elsewhere, ceilings are of $\frac{1}{2}$ -in. fibreboard fixed to wooden battens, except in the assembly hall, where perforated hardboard, backed by glass fibre sound-absorbent, has been used.

Heating is by low-pressure hot water from oil-fired boilers. Radiators are mostly of pressed steel. Staircases are heated by gilled tubes fixed to the outer edge of each landing. Large areas, such as the gymnasia, are heated by warm air from built-in cabinets, where the air is forced over gilled pipes connected to the hot-water system. The assembly hall and kitchen have extract fans and all laboratories have mechanically ventilated fume cupboards.

The school cost just under the Ministry of Education's standard allowance of £240 per pupil, the net total being £528,000. Certain additional works raised this figure to

£570,000; fees and administrative expenses came to £39,000; and the cost of furniture and equipments, mostly incidentally, designed by a special section of the Council's architects department, was £54,000.

Daylighting

The glass curtain walling provides an adequate level of illumination in all classrooms, laboratories, etc. Those facing south are equipped with venetian blinds to combat sun glare. The workshops have north-light roof-glazing and, in addition, small picture windows in the external walls, to enable the pupils to see out, while the gymnasia have monitor-type roofs, with glazed sloping sides, the raised portion being approximately half the width of the gymnasium.

Top-lighting, in the form of rectangular glass domes, has been used in the assembly hall and in the corridor of the workshop block; in the form of simple lanterns of wired cast glass it has been used also in that part of the staff room farthest from the windows. Clerestory lighting has been used only around the raised centre portion of the assembly hall.

Artificial Lighting

Apart from the standard classroom fittings, all luminaires were either chosen or designed by the architect, in collaboration with the council's chief engineer. The classrooms are mostly lit by nine 150-watt tungsten lamps in "Perspex" reflectors. Blackboard lighting is from a trough suspended from the ceiling containing four 60-watt tungsten lamps.

Art rooms, laboratories and drawing offices are lit by twin 4 ft. New Warm White fluorescent lamps in plastics reflectors, while the workshops are equipped with fittings of similar design to those used in the classrooms, except that they are made of aluminium instead of "Perspex." In addition, each machine has an adjustable bracket for local lighting.

In the assembly hall circular fittings with concentric louvres have been recessed into the ceiling. There are 45 in all, those in the raised central portion of the roof housing 300-watt tungsten lamps, the remainder housing

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200-watt lamps. As school housekeepers are not permitted to climb ladders over 17 ft. in height, access to the 300-watt fittings is from the roof.

The gymnasiums are each lit by eight fittings similar in design to those used in the classrooms, except that they are larger and are fitted with dished "Perspex" covers to protect the 500-watt lamps which they house. A quick-release mechanism enables the housekeeper to change the lamps from floor level with the aid of a long pole.

The cloakroom, which runs the whole length of the ground floor of the main block, has three long rows of

suspended fittings with opal glass shades. Fittings of similar design are used for the staircases and offices, while corridors are lit by tungsten lamps in circular glass bowls surface mounted both to ceilings and walls. In the library there are rows of tungsten lamps in diabolo-shaped plastics shades fixed closely to the ceiling.

The Installation

The main distribution system to the several blocks consists of P.I.L.C. and M.I.C.S. cables, from the main

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Metalworking shop with north-light roof. Artificial light is from fittings similar to those used in the classrooms, but with reflectors of aluminium instead of "Perspex."



One of the five gymnasiums.
Daylight is from the glazed sloping sides of the monitor-type roof; artificial light from eight fully-enclosed fittings housing 500-watt tungsten lamps.





The assembly hall
is lit by 45
circular fittings
with concentric
louvres, recessed
into the ceiling.
Daylight comes
from the clerestory
around the central
raised portion
of the hall.

cubicle panel in the workshop block, run in the various service ducts. In the teaching block, the cables terminate at the ground floor in two separate rising main systems extending to the top of the building. The rising mains consist of two sets of insulated copper rod, one for lighting, the other for general-purpose circuits, terminating at each floor at distribution boards housed in cupboards in the corridors.

Sub-circuits are wired with P.V.C. cables enclosed in heavy-gauge conduit, or M.I.C.S. cables, giving supply to approximately 2,070 lighting points, 340 sockets, 135 clocks, 30 fire-alarm points and 80 motors and machines having a connected load of over 930 kw. The various machines in each workshop are fed from a three-phase power system controlled by an oil circuit-breaker which, in turn, is controlled by an emergency stop system.

Socket outlets of the 13-amp. switched pattern are provided for general purposes in each classroom, corridor, etc., and science, biology, physics and chemistry laboratories are equipped with low-voltage terminal units supplied from an L.C.C.-designed power unit, with output voltages of 0.18 volts A.C. or D.C. All clocks are of the impulse pattern, which, together with the combined schools broadcast, class-change, public address and fire-alarm systems, are controlled from the radio room on the ground floor of the teaching block.



**The headmaster's study—it is lit, as
are the other administrative offices,
mainly by suspended fittings with
opal glass shades.**

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NEW PRODUCTS

Shop and display fittings

A range of fittings specially designed for shops, stores and exhibitions has been introduced by the A.E.I. Lamp and Lighting Co. Ltd. Maximum flexibility is given throughout the range by the standardisation of individual components of three main groups of recessed, semi-recessed and surface-mounted fittings. Interchangeability to the extent of a choice of six different trims available for each fitting permits 120 variations, eliminating the need for specially designed equipment.

A group of recessed fittings is based on two standard aluminium reflectors, one to house a horizontally mounted lamp intended for shallow ceiling cavities, the other for normal use with the lamp, in the cap-up position. Each of these fittings is available in three sizes with a standard metal soffit ring in each size. Either a glazing ring or a pierced metal "skirt" carrying one of a variety of glass diffusers or metal louvres can be readily inserted into the reflector by means of three bayonet catches. A similar fitting for reflector spotlights is available in two sizes.

A related range of semi-recessed fittings with shallow housings and deeper "skirts" is available for vertical lamp mounting in shallow ceiling cavities, with the same glassware or louvres. Included in this range is an improved "Eyeball" reflector spotlight fitting in two sizes which can be swivelled through an angle of 80 deg.

Five new spun aluminium housings for top or side entry surface mounting are available with a choice of five swivel mountings finished in chromium or polished brass. Three are a simple cone shape, one a slender diabolo, and the fifth a wide flask. The "Diabolo" and "Flask" reflectors can also be obtained suspended from a polished brass backplate on white PVC flex. Included in the range of surface-mounted fittings—all of which are available in red, white or black—are two sizes of a cylindrical aluminium spinning for direct attachment to a ceiling. These are designed to take the whole range of glassware or louvres where recessed fittings cannot be used, or where an alternative is required.

In addition, a new attachment has been introduced for the standard and proved type of mirror glass reflector. This comprises an anodised aluminium soffit ring and louvre and is designed for use with reflectors mounted above a secondary ceiling.

Bi-pin 5-ft. fluorescent lamps

Despite the many advantages of bi-pin caps it has until now been standard practice for fluorescent lamp manufacturers to use bayonet caps for the 5-ft. and 8-ft. sizes. Thorn Electrical Industries Ltd. announce that they are now adopting the bi-pin cap as standard on all "Atlas" fluorescent lamps and that although the existing types of fittings will remain unchanged all "Atlas" fittings in future will be designed to take bi-pin lamps. Among the many reasons leading to this decision is that the shorter cap and lampholder save space, enabling fittings to be shortened in length and placed in closer proximity end-to-end, thus reducing the extent of the dark gaps in a continuous run of light. It is thought that the use of bi-pin caps will do much to extend the popularity of the 8-ft. lamps.

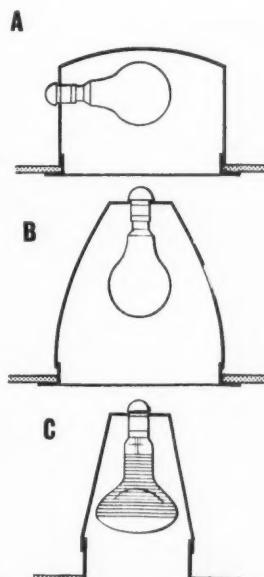
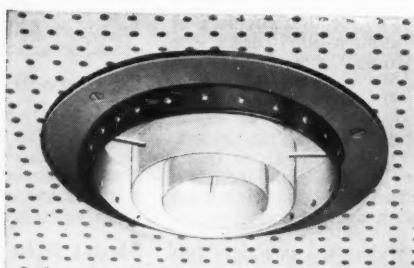
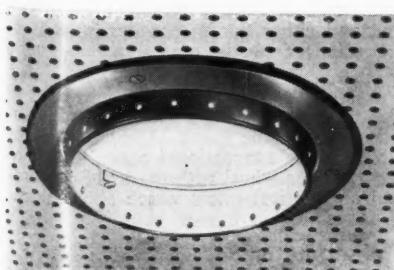
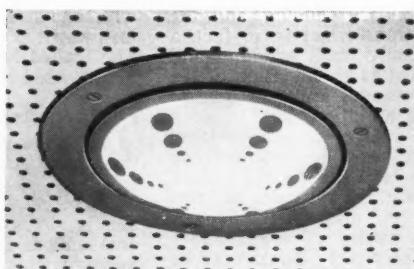
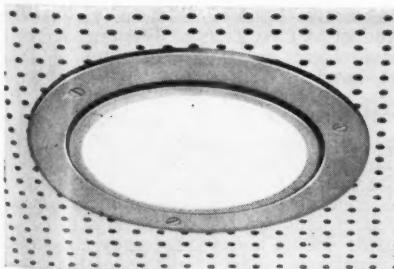
Fused mains terminal block

A new fused main terminal block has been developed by The G.E.C. Ltd. for use in fluorescent fittings. It is designed to provide sensitive fault protection, independent of circuit fuses, and will be incorporated in G.E.C. fluorescent lighting fittings in future. It will help to overcome the disadvantages resulting from the connection of the maximum number of fluorescent fittings on a final sub-circuit in an installation, and will enable faults to be traced quickly and help confine to the minimum the area blacked out because of a fault.

The fuse incorporated in the new terminal block is of standard miniature cartridge type and of 2A rating, but a special fusible element is employed to provide adequate protection, coupled with freedom from random failures in the absence of fault conditions. The one rating of cartridge is suitable for any fitting embodying one or more lamps of any size and a total wattage not exceeding three of 80-watt rating on normal supply voltages. For larger fittings, the internal circuits are divided between two or more fused terminal blocks which may be looped on the supply side. Since these fuses are located at the input to the whole of the fitting, they will serve to protect against any earth or short-circuit fault which might arise in tube, chokes, capacitors or in the internal wiring.

Lamp for deep sea lighting

A new 1,000-watt underwater lamp, which will operate at depths greater than 1,000 ft. with the bulb in direct contact with the water, has been developed by The G.E.C. Ltd., in



A selection of A.E.I. recessed reflector fittings for shop and display lighting. The diagrams show the reflectors; (a) for a horizontally mounted lamp, (b) for normal cap-up housing and (c) an adjustable mounting for reflector spotlights.

collaboration with the Admiralty Research Laboratory. It has been adopted as a standard equipment diving lamp in the Royal Navy and by several leading British marine salvage firms.

With the advent of modern diving equipment, underwater activities are extending rapidly, and the need for efficient transportable lighting equipment for use in connection with marine salvage, ship maintenance, and harbour building and repairs, necessitates the constant development of efficient light sources. A desirable requirement is that such a lamp should be lightweight, easy to handle, and simple to operate.

Experiments at the Admiralty Research Laboratory indicated that all these requirements could be met by using free-flooded lamps, so-called because the hydrostatic pressure is resisted by the glass envelope. The lamps operate in direct contact with the water and their success depends entirely on the implosion resistance of the glass envelope. The outer surface of the bulb is cooled effectively by immersion, but the inner surface is heated by radiation and conduction, through the gas filling, from the filament. The severe stresses set up by the thermal gradient in the bulb wall were found to have more bearing on bulb failure than the direct results of pressurised working. The wall thickness finally adopted for the bulb is about one millimetre, and this thickness in conjunction with a specially shaped bulb, successfully withstands a pressure of 650 lb. per sq. in. which is equivalent to a depth of about 1,300 ft. By ensuring that the lamp is only operated when fully submerged, advantage can be taken of the cooling effect of the water, which enables the bulb size to be reduced and the resistance to implosion to be improved.

The connections to the lamp are protected by a moulded rubber sealing muff which, with the special light-weight fitting originally designed by the A.R.L., was adapted by the G.E.C. to provide a complete underwater lighting unit.

Control gear

New switchless control gear for fluorescent tubes is now being incorporated in G.E.C. lighting fittings. It will supersede existing instant start gear for all normal applications, and costs only 11s. more than switch start gear per 80-watt lamp.

This new gear, named "C-start," is available for use with 80- and 40-watt lamps. The name has been chosen because the starting process is dependent on the power factor correction capacitor, which is connected in a novel position in the circuit. When the supply is switched on, current flows round the circuit which consists of the transformer primary, the P.F. capacitor and one of the lamp cathodes. The other cathode is heated by the current which is induced in a circuit consisting of the transformer secondary winding, and the other cathode of the lamp. The transformer is, in fact, a "current transformer" requiring only small windings and a small core, the latter being formed as an extension of the conventional choke core. Both cathodes are thus quickly brought up to emission temperature, and the voltage between them—being equal to the supply voltage—causes the lamp to start. For completely reliable starting, an earthed stripe instant-start lamp is recommended, as with the old circuit. After performing its starting function, the capacitor remains in circuit and, due to its value of 10.5 mfd. (in the 80-watt circuit), gives the circuit a power factor of about 0.98—practically as high as that which, previously, could only be obtained by the use of a "twin-lamp" type of circuit.

The C-start choke/transformer unit is made in three supply voltage ratings and is in "brick" section enclosed in a pressed steel high melting point bitumen-filled case. The capacitor is of the latest G.E.C. "Aroclor" type.

Shallow ballasts

A complete series of shallow height ballasts for 430 mA T12 slimline lighting systems is now available from International General Electric Company (U.S.A.). The latest is a fluorescent lamp ballast for operation of one eight-foot instant-start lamp that gives protection against end-of-lamp-life rectification damage.

All ballasts in this series are 1-25/32 inches in height and represent a weight reduction of from one to more than four pounds. This particular height is an optimum dimen-

sion, since it does not add height to fixtures with the standard 1½-inch lamps. Previous ballast height for most slimline ballasts was 2-5/8 inches.

Ballast for 'power groove' lamps

A new ballast designed especially for operation of new "power groove" lamps is now available from the International General Electric Company (U.S.A.). The ballast uses the rapid-start principle which provides instant starting of the lamps. Of minimum size and cost the unit has the flexibility inherent in rapid-start systems. Warning is given by the manufacturers that, as with 800 mA rapid-start systems, care must be exercised by fixture manufacturers in applying this new ballast-lamp combination; heat generation is high due to high lamp wattages, high current levels, and increased watts loss of the ballast. It is recommended that manufacturers make temperature measurements in their fixtures so that surface temperatures of the ballast will be within the warranty limit of 90 deg. C. Pendant-type fixtures mounted 8 in. or more from the ceiling with the bottom and top of the fixture open and no lamps positioned directly below the ballast compartment are most likely to provide adequate ventilation.

'Cool-light' tungsten lamp

Sylvania Electric Products Inc. (Salem, Mass., U.S.A.) has now introduced a "Cool-light" tungsten lamp which is available in 40-, 60-, 75- and 100-watt sizes, as well as in 50-150-watt three-way lamps.

The aqua-tinted "Cool-light" complements the cool colours on the low side of the colour spectrum (blue and green), whereas the pearl-pink "Softlight" introduced two years ago complements the warm colours on the high side of the spectrum—reds, oranges and yellows. The new lamp is recommended for use where an effect of cool restfulness is desired.

Luminous industrial magnifier

A pocket luminous magnifier with wide industrial applications has now become available in this country. One of its special features is that the light source—a miniature filament lamp—is so arranged that it illuminates the object directly from above. It is thus possible to examine cavities and hollow bodies (e.g., the interior of a boring) difficult to scrutinise with the conventional type of magnifier. The lamp is fed by two ordinary pocket-lamp batteries housed in the handle so that the instrument is completely self-contained, mobile and independent of general lighting conditions. It is available with interchangeable slip-on magnifier heads of different power—x3, x6, x8 and x10. The price is £6 15s. with one head; alternative heads £3 17s. 6d. each. The instrument is a product of Carl Zeiss of Western Germany. The United Kingdom agents are Degenhardt and Co., Ltd., 32, Maddox Street, London, W.1.

Photoelectric colorimeter

A photoelectric photometer made by W. Harrison (Station Road, Midge Hall, Preston, Lancs) enables measurements of lamp chromaticity to be made with a high degree of precision. It is applicable to most colour measurements and is already used in industry for such things as colour comparisons in textile dyeing and transparency and colour measurements on plastics and glass. Features of the instrument include colour filters which give a close approximation to the CIE Standard Observer, device giving equivalent scale length of 600 mm., and either fluorescent standards or internal Illuminant C standard can be used.

Eight-spectral band photometer

W. Harrison also announces an eight-spectral band photometer for the measurement of the spectral bands as specified in BS1853. Features include conventional optical system of compact design and template wheel with masks of combinations of mechanical and optical filters which allows immediate selection of bands.

Street lighting photometer

Evans Electroelenium Ltd. (Harlow, Essex) announce a new photoelectric photometer for the street lighting engineer.

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The selenium photocell is corrected for cosine error using the method developed by the BRS and is mounted on a universal head to allow for angular adjustment in both horizontal and vertical planes. Spirit level and sights permit correct horizontal setting of the photocell and alignment between street lamps. The head, with photocell, is mounted on a tripod complete with gauge, in order that measurements may be made 3 ft. above road level. A flexible cable plugs the photocell head into the measuring unit, comprising a taut suspension galvanometer and a range switch. The galvanometer scale is calibrated in lumens per sq. ft. permitting direct readings in four ranges, 0-0.2, 0-1, 0-5, 0-25 lm/ft². The instrument is designed to withstand the roughest treatment, and is provided with a hardwood carrying case 11 in. x 12½ in. x 6 in., complete with clips, lock and carrying handle, which houses the galvanometer unit. It contains pockets for storing the photocell head and the batteries for operating the galvanometer lamp.

Cargo cluster fitting

British Central Electrical Co., Ltd., announce a new type of lighting unit for building sites, dockyards, stores, ships holds and all applications where rough tough use is likely, or danger from shock is a hazard. The fitting is almost indestructible, completely insulated and easily dismantled. The guard and suspension ring are of 10-gauge mild-steel wire, completely enveloped in heat, acid, and corrosion-resisting polythene coating 1/64-in. thick. It is hinged at the bottom for easy lamp insertion. The white alkathene reflector is unbreakable, washable, corrosion resistant, and has a high reflection factor.

The lampholder is of nylon, and is unbreakable. Its contacts are of the solid end type; the springs being mounted behind the contacts, do not carry current. A unique form of flex lock, which prevents any strain being transmitted to the lampholder when used with TRS flexible cable, completes the safety features.

Prismatic commercial fitting

Day-Brite Lighting Inc. (16N. 9th Street, St. Louis, Missouri, U.S.A.) announce a fitting named "Holiday" which is described as providing "the ultra comfort of prismatic controlled light." A hinged 4-ft. enclosure incorporates two injection moulded prismatic elements. Lens control provides sufficient upward component to light the surrounding ceiling area. It was designed specifically for application in low-ceiling areas and is recommended for schools, offices, stores, under balconies, and in modern industrial areas involving critical seeing tasks. It is equipped with "rapid-start" ballasts and can be furnished as 4-ft. units with ends, 8-ft. units with ends, and 8-ft. fill-in section with coupling.

Trade Notes

Sales organisation

A new, specialised sales organisation for fluorescent lighting fittings has been formed by the Lighting Division of Sylvania Electric Products Inc. The new sales group, which is separate from the company's existing lighting sales organisation, is headed by Richard G. Slauer, fittings sales manager for lighting products.

Depots

Heyes and Co. Ltd. have recently opened a Scottish sales depot at 158, Bath Street, Glasgow, C.2. Representatives James Fisher and Charles Smith will operate from this address providing additional service in the supply of lighting fittings and electrical mining equipment in the Scottish area.

Simplex Electric Co. Ltd. recently opened a new main London depot at Alperton, Middlesex, which will serve as the centre to a series of sub-depots at Luton, Reading and Ashford in Kent, for all Simplex and Creda products such as conduit fittings, switch and distribution gear, lighting fittings, accessories, cookers, water heaters, etc.

Representative

Lumenated Ceilings Ltd. are now being represented in the north-east area by the parent company, Thermotank, Ltd.

In future all local inquiries regarding the Lumenated Ceiling architectural lighting system will be dealt with by Mr. R. E. M. Wilson, Thermotank, Ltd., Tyneside Works, Bede Trading Estate, Jarrow-on-Tyne, Co. Durham. (Telephone: Jarrow 89-7171.)

Exhibition

"Shop and Display Lighting," the A.E.I. Lamp and Lighting Company's exhibition featuring an extensive new range of equipment for shop, store and exhibition lighting, opened in the Mazda Showroom at Crown House, Aldwych, on December 3.

A "new" showroom interior has been created by the designers, Robert Wetmore and Frederick Dickinson, with the use of an entirely different ceiling formation and the installation of semi-permanent displays. A false ceiling has been installed throughout the showroom, with the exception of a central well, the bounding fascia of which carries the whole range of newly introduced lighting fittings.

An important part is played in the exhibition by actual display windows dressed by London stores, in which have been installed lighting schemes specially designed to display each type of merchandise to the best advantage.

The exhibition will later be shown at the company's recently opened Birmingham and Glasgow showrooms.

Lumenated Ceilings

Aluminium framing and components for their architectural lighting system have now been introduced by Lumenated Ceilings Ltd. (Alliance House, Caxton Street, London, S.W.1) in addition to the stove-enamelled steel framework now being supplied. Streamline production methods have allowed the new aluminium track and components to be supplied without increase in price, although an extra charge is involved if it is required to be anodised.

The reduction in weight of the Lumenated Ceiling—from 12 oz. to 5 oz. per sq. ft.—will allow certain structural economies, while the new track's exposed soffit, which has a rippled or "fluted" pattern on its polished surface, enhances the appearance of an installation, particularly as the width of the track is reduced to less than 2 in. The material used for the framework is 99 per cent. pure aluminium, which is highly resistant to tarnishing or corrosion.

The introduction of aluminium framework is part of an overall programme being carried out by Lumenated Ceilings Ltd. to streamline their lighting system and to reduce the number of component parts. The T-shaped junction plates formerly used to connect the framework track have now been replaced by concealed connectors which allow the framework to be neatly mitred without screws. Continuous lengths of track can be achieved also by using the new concealed connectors, the lengths being held firmly together with a neat butt joint; the corrugated translucent vinyl sheets are now retained in the framework by quick-sliding open track sections. By these means the actual assembly and erection of a Lumenated Ceiling has been greatly simplified affording economy both in time and labour.

Acoustic baffles which can be used in conjunction with a Lumenated Ceiling without requiring additional ceiling space in the horizontal plane have also been introduced. The tops of these baffles are lipped so that they can be fitted into the flanges of a special aluminium track supplied in place of the normal Lumenated Ceiling framework. The baffles are rigid lightweight units made up of perforated aluminium sheet formed in a U-section and filled with a fibrous acoustical absorbent. They are available in lengths of up to 8 ft., which can be butted together by means of special aluminium fittings where greater lengths are required. The ends of the baffles are neatly finished with riveted end plates. They are claimed to be most effective when installed at 3 ft. centres, and can be supplied either with a natural finish, or anodised in a range of colours.

Mercury lamps

General Electric Co. Ltd. and the A.E.I. Lamp and Lighting Co. Ltd. announce reductions in the prices of colour-corrected mercury fluorescent lamps, type MBF/U. The 250-watt lamp now costs £4 19s. 0d. and the 400-watt lamp, £6 10s. 0d.

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I.E.S. ACTIVITIES

London

At the meeting held in London on December 11 a paper entitled "Automobile headlamps: the ISO/CIE international tests and their influence on meeting beam design," was presented by Dr. J. H. Nelson.

The difference in the ideas of the Anglo-American school of headlamp meeting beam design and the European school have been evident for many years. Under the conditions of trading that existed before the war these differences were largely academic, since vehicles operating in any one territory were always equipped with lamps made to the ideas of the local designers, imported vehicles almost always having their lamps changed. From 1946 the acute shortage of transport in Europe was partially relieved by the importation of large numbers of British and American vehicles, and under the conditions then existing alterations to the lighting equipment were not practicable.

As the consequence of experience and criticisms levelled by the protagonists of each school of thought, the Economic Commission for Europe asked the International Organisation for Standardisation (ISO) to investigate the relevant merits of the lamps made to the two schools of thought and to make recommendations. The ISO felt that such work could only be carried out in collaboration with the International Commission on Illumination (CIE), and these two organisations set up a working party to carry out the necessary experimental work to answer the request made to the ISO by the ECE.

The paper described briefly the work carried out by this working party and the problems which arose in the preparation of the committee's formal report, which was adopted by the CIE in 1955 and by the ISO in 1956.

The beam of the European school is characterised by a hard optical cut-off, so arranged to give extreme relief from glare above the horizontal, limiting light to a zone about 1 deg. below the horizontal and downwards, and having a distribution symmetrical about a vertical plane through the axis of the lamps. The Anglo-American system is characterised by an asymmetrical distribution giving more relief from glare in the off-side top quadrant of the beam, but at the same time providing illumination along the nearside kerb at, and nearly up to, the horizontal. No attempt is made in the Anglo-American system to achieve the hard cut-off of the European school, and the optical system uses a simpler bulb but on the whole a more complicated lens design.

The first requirement was to choose a representative lamp for each of the two schools of thought. As the majority of the national committees taking part drive on the right-hand side of the road, the American sealed beam was adopted as representative of British and American practice. The representative European lamp was only arrived at as the result of a series of tests and demonstrations carried out among the European committees.

After selecting the appropriate lamps and specifying the method of aiming the lamps in service, the nature of the tests to be carried out to compare the efficacy of the two systems was decided. All the visibility tests included some element of motion, in the case of the straight-ahead tests both drivers and oncoming cars were in motion, whilst on curves a stationary glare source was occasionally used. In addition to the visibility tests a form of appreciation test developed by the Road Research Laboratory in Great Britain was included.

The recommendations of the working party are summarised as follows:—

(1) Aiming

For good performance of a passing beam correct aiming is essential and it is recommended that the headlamp aiming in service be inspected periodically.

(2) Light Distribution

To obtain a better visibility it is necessary to accept a certain asymmetry of the passing beam. The Anglo-American

delegations recommend in principle the passing beam for the improved sealed beam; the European delegations recommend in principle the uniform European passing beam. The delegations recommend that passing beam specifications be based only on the luminous characteristics to the exclusion of any power limit.

(3) International Approval

It is recommended that countries accepting a same specification of passing beam should come to an agreement to accept on a reciprocal basis the use of headlamps approved by one of them according to this definition, and to a unique approval procedure tied to this definition.

(4) Interchangeability

The fourth recommendation recognises the commercial importance of making it possible to fit lamps of the appropriate school of thought on to all vehicles which are made for sale throughout the world.

The immediate practical result of the working party's report is the New Unified European beam. Even if this still differs from the ideas of the Anglo-American school, it represents an advance in two respects; firstly there is now one agreed standard for Europe, and, secondly, the differences between the European and Anglo-American ideas have been reduced. The overwhelming importance of lamp aiming is made quite evident, and the clear call for vehicle inspection must also rank as a major practical result of the report. On the more theoretical side the new methods of assessment, although their development is not yet complete, have already improved our understanding of the factors involved in vehicle lighting. Among these is the influence of the lamp aiming standard in a territory on the design of meeting beam most suitable, a factor stressed by the work of the Road Research Laboratory.

Leicester Centre

On November 23 the Leicester Centre held its second annual social at The Coronation Hotel when the Committee and members were pleased to welcome as their chief guest Dr. R. G. Hopkinson, a Vice-President of the Society. A party of over 50 members and friends enjoyed what perhaps to many of them was the first Christmas party of the year. Before the supper the Leicester Chairman, Mr. Peter Weston, introduced Dr. Hopkinson, who in a brief speech said this was perhaps his first official function as Vice-President and how disappointed he was that Mrs. Hopkinson could not be present. It was agreed by all that it was a most successful meeting. The programme was arranged by the Centre Secretary, Mr. A. E. Bird.

Sheffield Centre

At a meeting on November 12, Dr. H. H. Ballin presented a paper entitled "Trends in Interior Installations."

The theme of the paper was the intense development which has taken place in lighting installations during the last 10 years. The lecturer mentioned how modern installations were the product of concerted thought of both lighting engineers and architects, which had resulted in schemes which were highly efficient and architecturally beautiful.

The use of higher levels of illumination in shops with standards of 60-90 lm/ft² compared with an average of 25 lm/ft² a few years ago had, along with the use of coloured fluorescent lamps, altered the whole character of presentation, such that both windows and interiors have become exceedingly attractive. The developments include the use of industrial trunking which gives flexibility in design, thus enabling the lighting engineer to provide different levels of illumination as required.

The paper was amply illustrated by the use of lantern slides, which included a table giving comparative increases in lumen output of fluorescent lamps from their origination to the present time; it was shown that the user of modern fluorescent lamps gets 12 times the value for money of the original users.

The discussion was opened by Mr. J. M. Whitaker, who, after congratulating the lecturer on the presentation of his paper, took issue with him on the use of 8-ft. fluorescent lamps, compared with tungsten or blended units for high bay lighting under the very dirty industrial conditions that



At the recent Ladies' Night of the Birmingham Centre:—Mr. and Mrs. V. A. Heydon, the President and Mrs. Harper.

are fairly general in Sheffield. Mr. Louparte proposed a vote of thanks to Dr. Ballin.

Nottingham Centre

At the November meeting of the Nottingham Centre some 34 members and guests heard a most interesting lecture given by Dr. J. H. Nelson on Road Vehicle Lighting. Dr. Nelson gave details of discussions and tests which had been arranged on an international basis in an endeavour to reconcile the motor vehicle headlight systems as used on Anglo-American vehicles and those of Continental origin. He intimated that as a result of this investigation it was very probable that the advantages of the two systems would be merged into a highly efficient lighting unit.

Among the visitors were representatives from a number of transport organisations and from industrial concerns maintaining fleets of vehicles. These and other members and visitors bombarded the speaker with questions during the discussion, which was opened by Mr. B. N. Cobbe. A vote of thanks to Dr. Nelson was proposed by Mr. J. Woodhouse.

Leeds Centre

At a meeting held in Hull on October 29, Mr. K. C. White presented a paper entitled "Shop and Store Lighting." The speaker examined the factors influencing modern store lighting practice, from the standpoint of the architect, and shopfitter and lighting engineer.

Shops and stores are divided into four main areas—shops fronts, interior, hidden surfaces (store-rooms, accounts, etc.) and engineering services (plumbers, electricians, store-fitters, etc.). In dealing with shop fronts the question of daylight window reflection was considered, and a method of overcoming this condition with a background build-up of brightness was discussed. With modern standards of lighting intensities, excessive heat is often generated within confined window spaces, particularly where tungsten lamps are used. A method of drawing warm air from the window through a ventilating system and re-directing the heat to other parts of the store has been devised.

With regard to interiors, lighting must be arranged for three classes of sales areas—demand, convenience and impulse.

"Demand" articles are those for which a customer normally enters the shop and which are normally placed at

the far end of the shop with lighting arranged to lead the customer to the point of sale. Socks, ties, collars, etc., would be "convenient" articles, not necessary for the purchase of a suit, but useful and convenient accessories; they must be treated with a higher level of illumination, so that they stand out as a display. On leaving the shop the customer is confronted with "impulse" merchandise, cuff-links, dress wear studs or gift items, that were not part of the original purchase plan, but which provide a ready sale through their impulse appeal; here lighting can be bright to command attention. The author pointed out that distraction glare in other fields of lighting is often attraction glare in store lighting.

In conclusion, a selection of well-chosen coloured slides of store installations was shown, with a critical appraisal from the speaker.

In opening the discussion from the chair, Mr. Harcourt remarked that the use of tungsten spotlights for general lighting was a common feature of the installations illustrated; Mr. Harcourt and Mr. Kerridge also commented on this trend. Mr. White, in reply, suggested that there are many store applications where fluorescent lighting alone is not entirely suitable, notably shoe shops. In this case the tungsten spotlight proved to be a useful alternative since it provided general lighting, good highlights and conformed to contemporary architecture. There are, he said, a number of good designs of highly efficient silvered reflectors now available which accommodate normal tungsten lamps, but give the distribution characteristics of an internally silvered reflector.

Transvaal Centre

The Transvaal Centre has rearranged its session to coincide with that in the United Kingdom. The new chairman who took office in October is Mr. T. S. Harper. Mr. Harper was educated at Plumtree College, Southern Rhodesia, and during the war served as a fighter pilot. After the war he joined the BTH Company in England and in 1949 he returned to South Africa with BTH (South Africa). In 1953 he joined the British General Electric Co. (Pty) Ltd. (South Africa). He is a Registered Lighting Engineer (IES).



FORTHCOMING EVENTS

LONDON

January 8th

Sessional Meeting. "Lighting as an Effective Aid to Architecture," by H. R. Ruff, H. E. Bellchambers and R. V. Mills. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

CENTRES AND GROUPS

January 1st

BIRMINGHAM.—Display of Lighting Fittings. (At Birmingham College of Technology, Suffolk Street.) 6 p.m.

January 3rd

CARDIFF.—"Streetlighting and South Wales," by F. H. Pulvermacher, and "Eye Appeal," by W. G. Street. (At the South Wales Electricity Board's Demonstration Theatre, The Hayes, Cardiff.) 7 p.m.

NOTTINGHAM.—"Lighting of Standard Factories on Trading Estates," by J. S. McCulloch. (At the Electricity Service Centre, Smithy Row, Nottingham.) 5.30 for 6 p.m.

January 5th

BATH AND BRISTOL.—"Lighting of Shops and Stores," by R. L. C. Tate. (At Exeter.) 7 p.m.

January 7th

LEEDS.—"Light and its Effect on Plant Growth," by S. S. Beggs. (At the Yorkshire Electricity Board Lecture Theatre, Ferensway, Hull.) 7 p.m.

January 9th

EDINBURGH.—"The Electrical Contractor's Approach to Artificial Lighting," by E. Cassidy. (At the Y.M.C.A., 14, South Street, Andrew Street, Edinburgh.) 6.15 p.m.

NEWCASTLE-UPON-TYNE.—"The Lighting of Small Factories,"

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by J. S. McCulloch. (At the Large Lecture Theatre, Grey Hall, Department of Electrical Engineering, King's College, College Road, Newcastle-upon-Tyne 1.) 6.15 p.m.

SWANSEA.—"Maintenance of Lighting Installations," by J. W. Strange. (At the Demonstration Theatre of The South Wales Electricity Board, The Kingsway, Swansea.) 6.30 p.m.

January 10th

GLASGOW.—"How I Look at Lighting Engineering," by C. Stuart and L. C. Rettig. (At the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2.) 6.30 p.m.

January 11th

EDINBURGH.—Annual Supper and Buffet Dance. (At the Grosvenor Hotel.)

January 15th

GLoucester AND CHELTENHAM.—"X-rays in Industry," by K. R. Alsop. (At the Fleece Hotel, Westgate Street, Gloucester.) 6.30 p.m.

LIVERPOOL.—"A Review of Street Lighting in Great Britain," by C. C. Smith. (At the Liverpool Passenger Transport Office, 24, Hatton Garden, Liverpool.) 6 p.m.

January 16th

NORTH LANCASHIRE.—"The New I.E.S. Code," by H. C. Weston. (At the Demonstration Theatre, The North Western Electricity Board, 19, Friargate, Preston.) 7.15 p.m.

TEES-SIDE.—"The Lighting of Small Factories," by J. S. McCulloch. (At the Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough.) 6.30 p.m.

January 17th

MANCHESTER.—"The Evolution of the I.E.S. Code," by H. C. Weston. (At the Demonstration Theatre of the North Western Electricity Board, Town Hall, Manchester.) 7 p.m.

January 25th

BIRMINGHAM.—"Lighting of Educational Institutes," by A. G. Shepard Fidler. (At "Regent House," St. Phillip's Place, Colmore Row, Birmingham.) 6 p.m.

GLASGOW.—Luncheon meeting in Georgic Restaurant, Union Street, Glasgow.) 12.30 p.m.

NEWCASTLE-UPON-TYNE.—Dinner Dance. (At the County Hotel, Neville Street.)

January 28th

LEEDS.—"Lighting Installation Practice in Mines," by W. B. Bell. (At the E.L.M.A. Lighting Service Bureau, 24, Aire Street, Leeds 1.) 6.15 p.m.

LEICESTER.—Brains Trust. (At the Demonstration Theatre of the East Midlands Electricity Board, Charles Street, Leicester.) 6 p.m.

January 29th

EDINBURGH.—Joint meeting with the Edinburgh Electrical Society. (At the Scottish Lyceum Gallery and Restaurant, 11, Atholl Crescent, Edinburgh 3.) 7.30 p.m.

May 3rd and 4th

Week-end meeting of Edinburgh, Glasgow and Newcastle Centres at Peebles Hotel Hydro, Peebles.

Personal

Cryselco Limited announce the following new appointments to their managerial staff:—**MR. FRED J. BURNS**, who is at present manager of the Liverpool branch, is to become assistant sales manager of the company; **MR. N. B. W. CASTLETON**, at present the Cardiff branch manager, will take over the Liverpool branch from Mr. Burns; **MR. R. J. BASS**, senior representative in South Wales, will take over as manager of the Cardiff branch from Mr. Castleton.

MR. FRANK F. NEWLANDS, a director of Claude-General Neon Lighting Ltd. since 1951, has just completed twenty-one years' service with the company. He is at present chairman of the Electrical Sign Manufacturers' Association and is a member of the Outdoor Advertising Industry Advisory Committee.

MR. JOSEPH SAMUELS, who joined Winston Electronics Ltd. in 1954 as chief buyer, has now been elected to the board of the company.

MR. G. R. BUCKLEY and **MR. C. G. MACKIE**, directors of The Stanton Ironworks Company Limited, have been appointed assistant managing director (works) and assistant

managing director (commercial) respectively. **MR. N. C. MACDIARMID** has been appointed assistant managing director (general).

MR. S. R. EADE has been appointed sole managing director and **MR. J. CLEMENT** sales director of the A.E.I. Lamp and Lighting Co. Ltd. Mr. S. R. Eade, who was appointed joint managing director of the company in 1955, joined the British Thomson-Houston Co. Ltd. in 1924 as an engineering apprentice. He was on the staff of the B.T.H. Research Laboratory from 1929 until he became lamp works engineer in 1939. He was appointed manager, Leicester Lamp Works, in 1945 and manager of all B.T.H. lamp factories in 1949. Mr. J. Clement completed his engineering apprenticeship with B.T.H., Rugby, in 1928, and was appointed B.T.H. district office manager, Newcastle-upon-Tyne, in 1936. In December, 1946, he was transferred to Birmingham office as manager, a position he held until 1955, when he was appointed assistant sales manager, B.T.H.

Courtney, Pope (Electrical) Ltd. announce the appointment of **MR. J. E. TONGE** as their northern area manager, who may be located at their recently opened showrooms at 8, Chatham Street, Piccadilly, Manchester.

MR. D. J. BILLER, chairman of the board of Day-Brite Lighting Inc., St. Louis, Missouri, announces the appointment of **MR. JAMES E. WHITEHEAD, JR.**, as executive vice-president of the company, and **MR. GEORGE J. TAYLOR** as vice-president in charge of Eastern operations.

Situations

Vacant

DRAUGHTSMAN. Holophane Limited require a Draughtsman for design work on specialised lighting fittings, using a variety of metals and manufacturing techniques with both glass and plastics for light control. The work is under the direct control of the Technical Director, and extends from original design sketches to detailed production drawings. Roomy and well-lit drawing offices. Pension scheme. Write Technical Director, Holophane Ltd., Elverton Street, Westminster, S.W.1.

DRAUGHTSMAN with electrical experience, good education, preferably ONC or higher standard. Interesting and varied work in small West End technical design and sales office. Write Chance-Londex Ltd., 10, Rose and Crown Yard, S.W.1.

Siemens Brothers and Co. Limited have a vacancy in their Birmingham office for an **ILLUMINATING ENGINEER**. Candidates must have some experience in the design of lighting installations for modern factories and offices, and for exterior illumination, including street lighting. The duties include preparation of estimates and a knowledge of electrical contracting would be an added advantage. Write Area Manager, 8-10, Albert Street, Birmingham, 4.

Ekco-Ensign Electric Ltd. have vacancy in their London Office for **LIGHTING ENGINEER**. He should be well educated and conversant with modern lighting methods. Apply Senior Lighting Engineer, 45, Essex Street, W.C.2.

JUNIOR SALES ENGINEER required for London area for the sale of Thorlux Industrial Lighting Equipment. Good prospects with pension. Write, stating age, previous experience, to F. W. Thorpe, Ltd., Welby Road, Hall Green, Birmingham.

A vacancy exists in the London Office of Lumenated Ceilings Ltd. for a **SENIOR LIGHTING ENGINEER**. Applicants should hold City and Guilds Final Certificate in Engineering or be Registered Lighting Engineers with ability to discuss projects with architects and clients at high level. Commencing salary according to age and experience within the range of £650-£900 p.a. Write to the London Manager, Lumenated Ceilings Ltd., Alliance House, Caxton Street, S.W.1.

A vacancy occurs in the Baker Street area for a **DRAUGHTSMAN** for specialist hospital lighting and electrical control equipment. Used to working on own initiative, willing to travel, five-day week, pension scheme, A.E.S.D. rates or over to keen man, with view to taking charge of small drawing office. Box No. 929.

POSTSCRIPT By "Lumeritas"

ACCORDING to H.M. Chief Inspector of Factories, whose Annual Report for 1955 was published last month, the general standard of both artificial and natural lighting in the factories inspected was usually satisfactory, although a few black spots remained, chiefly in the older industries. However, the general standard of outdoor lighting left much to be desired and factory inspectors were concerned over the number of accidents which occurred in outside areas at night and which could be directly ascribed to poor lighting. That so little adverse criticism of the lighting of factory interiors is made by the chief inspector indicates how extensive has been the improvement brought about in recent years, much of it due to the adoption of fluorescent lighting. The report also states that interest in colour schemes was found to be unabated. In some cases this interest was prompted by the need to attract workers but, in others, it sprang from a genuine pride of occupiers in their factories.

THE subject of motor-car headlamps, which was dealt with in a paper given by Dr. J. H. Nelson to the IES last month, is one which now interests a larger public than ever before, even though many motorists are likely to have little experience of night driving this winter. It is a great pity that misaiming of headlights is so common, for all the care and skill that has been given to the design of headlamps which, when properly operated, will cause the minimum of inconvenience by glare to the drivers of meeting vehicles is nullified by this faulty practice. If all motor vehicles on the road were equipped with equally well-designed driving lamps of adequate and standard power, and if they were maintained in good condition and their adjustment corrected automatically for variations in vehicle loading and road inclinations, the problem of dazzle would be solved. However, this is a counsel of perfection, and dazzle is likely to be one of the unwelcome experiences in night driving for some considerable time.

I AM reminded by the Editor that with this issue *Light and Lighting* enters upon its fiftieth year of publication. Its silver jubilee was celebrated while it was under the editorship of the late J. S. Dow, by whom most of the editorial work was done even during the lifetime of its founder, Leon Gaster. It has had its vicissitudes and its "growing pains," as many of its contemporary journals have had, but it has become a journal of high repute which has its readers in more than 50 countries. No doubt its present enthusiastic editor has plans for a particularly interesting fiftieth volume and, in due course, a worthy golden jubilee number. In the year following the birth of this journal the IES was founded in London and so the golden jubilee of the Society, too, lies not far ahead. No doubt we shall soon be hearing something of the plans being laid for celebrating this interesting event.

WHILE on the subject of birthdays, it was in the month of January nearly 400 years ago (1560 to be precise) that one of the most remarkable of the first Elizabethans was born; namely, Francis Lord Bacon. There are many sage references to light in his writings, and his "Scala Intellectus" contains "A table of enquiries for the particular history of light and splendor" which is, in fact, a programme of research into the nature, sources and effects of light. Incidentally, "splendor" in Bacon's time meant what we now term "luminance." Article III of this programme relates to "The Multiplications of Light." It reads: "Let the enquiry next descend to the multiplications of light, as by speculums . . . and the like which have a power to sharpen light and throw it to a great distance, or else render it more subtile and better disposed for distinguishing visible objects, as we see by the practice of jewellers, and other artists, who set a spherical glass of water between the candle and their work."

In another of his works, "Sylva Sylvarum, or The History of Nature," Bacon comments on the mixture of coloured lights and the effects of the colour of walls in rooms. He also remarks that "two candles of equal light will not render things visible twice as far as one." The cause, he says, "lies deep." He did not know the form of the relationship between illumination and visual capacity, but he knew enough to realise that it is not a simple arithmetic one. Other topics which receive some mention are glare and visual pleasure. "It is manifest," he writes, "that light, above all things rejoices the spirits of men: and, probably, varied light has the same effect with greater novelty . . . it were, therefore, proper to have tinged lanthorns, or skreens of glass, coloured green, blue, carnation, crimson, purple, etc., and to use them with candles in the night."

OUTRAGE, published in *The Architectural Press* for June, 1955, has a sequel, COUNTER-ATTACK, in the December issue of the *Review* in which Ian Nairn and others present a plan of action to get us out of the mess we are in—the mess, let me remind you, being subtopian sprawl and general disfigurement of town and country. The subject is one with which we are all concerned; the campaign is one we should all in principle support. The street lighting section makes some good points on the daylight appearance of installations and deserves careful study. Some good examples of Swiss lamp columns are shown and it is suggested that British lighting engineers should be compelled to make a visit to Switzerland to study street lighting equipment; a suggestion with which many of my readers would no doubt willingly agree. The much-publicised, and in some aspects misleading, picture of columns at the Folkestone APLE conference is again used as evidence but it serves its purpose in showing some of the worst features of columns.

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